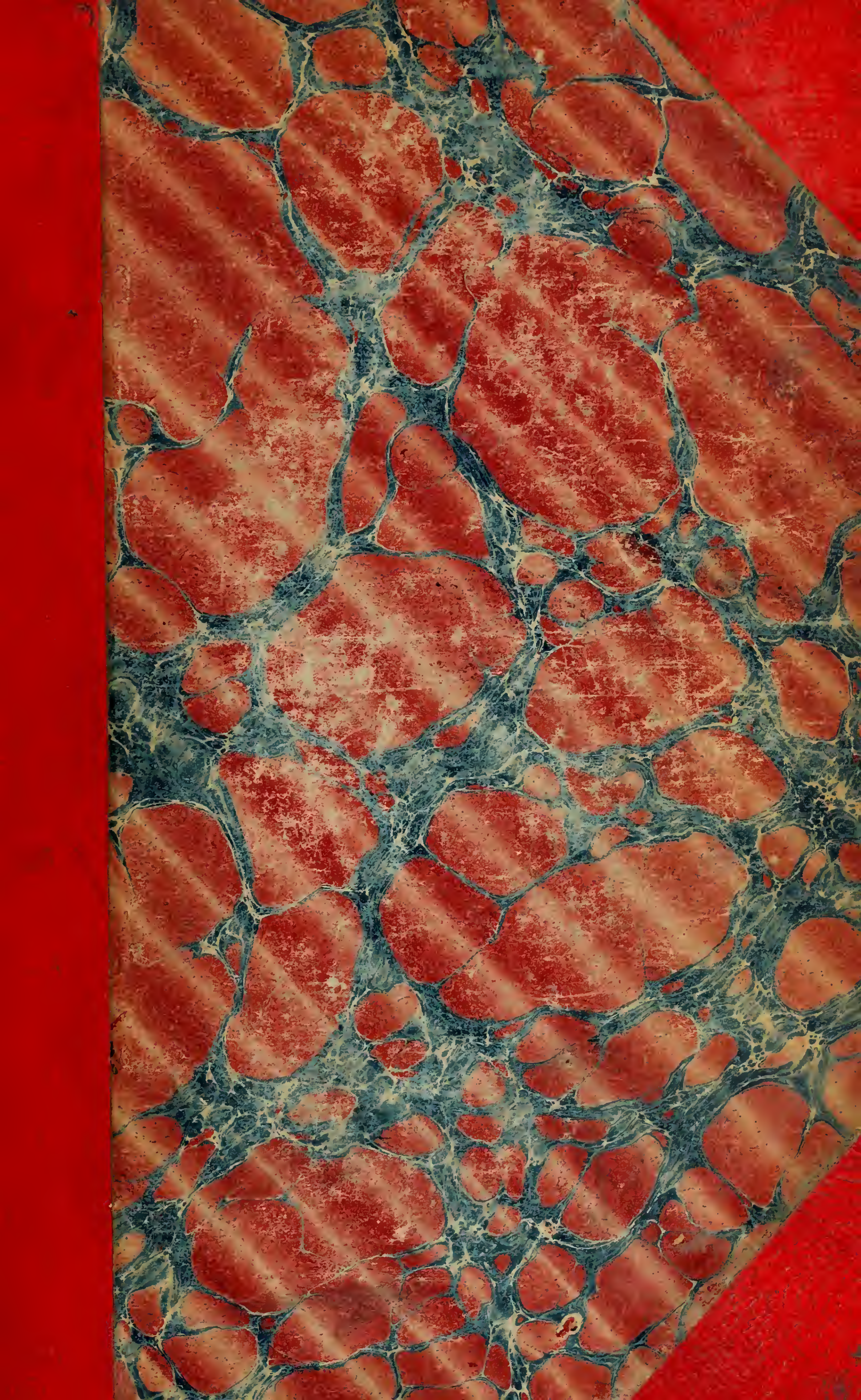


Book No. ....

ROYAL
COLLEGE
OF DENTAL
SURGEONS·

LIBRARY

Books may be retained for one week and may be renewed once if no application has been registered for them. For longer detention a fine of 5 cents per day will be imposed.

The Librarian shall examine every book returned and if the same be found marked, spotted with ink, with leaves turned down or in any way injured, the borrower shall pay the value of the book.

ROYAL COLLEGE OF
DENTAL SURGEONS OF ONTARIO.

Digitized by the Internet Archive
in 2011 with funding from
University of Toronto

http://www.archive.org/details/odontographicjou01roch

106-1

Vol 1

No 1

PHOTO-ENG. CO. N.Y.

THE LUDICROUS OPERATOR.

(From Dental Miscellany.)

THE

Odontographic Journal,

CONDUCTED BY J. EDWD. LINE, D. D. S.

VOLUME I

April, July, October, January.

ROCHESTER, N. Y.
DAVIS & LEYDEN.
95 & 97 [illegible] Street.
[illegible]

[illegible]

[illegible]

THE

Odontographic Journal,

CONDUCTED BY J. EDWD. LINE. D. D. S.

VOLUME I.

April, July, October, January.

ROCHESTER, N. Y.:
DAVIS & LEYDEN,
91 & 93 State Street,
1881.

PRINTED BY
JOHN P. SMITH, 271 BROWN ST.,
ROCHESTER, N., Y.

CONTENTS OF VOLUME I.

ORIGINAL COMMUNICATIONS.

PAGE.
Attraction in Dental Society Meetings—Dr. F. E. Howard 26
Crowded Dentures—Dr. H. S. Chase 4
Necrosis—Dr. R. H. Hofheinz 19
Phosphate of Zinc Under Pressure—Dr. J. Requa 46
Preparation of the Mouth for Artificial Dentures—Dr. A. P. Burkhart 28
Preservation of All the Natural Teeth—Dr. Johu P. Codman 43
Success in Practice—Dr. S. B. Palmer 71
Temperaments—Dr. W. E. Royce 1
The Amœba—Dr. Anna H. Searing 39
The Electro-Chemical Theory—Dr. S. B. Palmer 22
The Value of Electricity in the Practice of Dental Surgery—Dr. Geo. H. Perine 69

SELECTIONS.

A Cyclopædia of Practical Dentistry 9
Alveolar-Dental Periosteum 10
Aqua Fortes 82
Cervico-Brachial Neuralgia Cured, etc 57
Conventional (Dental) Decorum 47
Dental Association of United States of America 49
Dental Decay—A Remarkable Fact 10
Dental Histology 29
Epilepsy Caused by Diseased Teeth 59
Extinct Toothed Birds 75
Fashion in Deformity 88
Fatal Carelessness 58
Heveenoid—The Rubber of the Future 83
Medicine in Ancient Egypt 86
Nasmyth's Membrane 6
New Motor for the Operating Room 51
No "Battery" in a Tooth 36
Odds and Ends 59 and 91
Rapid Breathing for Relief of Pain 90
Recent Decisions Relative to Patents 52

PAGE.
The Antiseptic Treatment of Roots 77
The Pharmacopœia 80
Tooth Structure Illustrated 87

CONDUCTORIAL.

A Good Send Off 94
An Assistant 96
Another Bugaboo 33
By Telegraph 96
Celluloid 12
Hospital of Oral Surgeons 65
Hydrobromic Ether 15
Hymenial 96
Judge Blatchford's Decision 64
Nasmyth's Membrane 11
National Meetings 62
New Disks 14
News 95
Oral Surgery 95
Our Enterprise 61
Personal 66
Salutatory 11
Somethings Microscopical 93
Stamp your Dentifrice 15
The Proper Word 14
Those Disks 35
Who is My Neighbor 65
Why They Do It 35

CORRESPONDENCE.

A Violent Case of Universal Genius 96

NECROLOGICAL.

Robert Arthur, M. D., D. D. S., ... 66
Thomas Bell, F. R. S. 35
Samuel S. White, D. D. S., ... 15
Bibliographical 16–67–97
Filings 17–37–67–98

THE

Odontographic Journal.

VOL. I.——*April*, 1880.——NO. 1.

TEMPERAMENTS.

BY W. E. ROYCE, D. D. S.

One of the first and most important steps towards success in any dental operation, is to obtain complete control and confidence of the patient. To obtain this, it is necessary to be able quickly to read character. The stern, and at times, even harsh manner which it is necessary to assume towards one patient in order to get them to submit to a dreaded operation, would so terrify another that they would become perfectly unmanageable, but a few words of sympathetic encouragement will prepare them to endure any amount of pain. With one patient you can reason, show them that you only hurt them when it is absolutely necessary, and for their best interest, and they will endure the most severe operation without flinching. With another every moment spent in reasoning is worse than wasted. You might as well reason with the wall. They do not hear a word you say. The one idea of being hurt seems to be the only one they, at the time, are able to comprehend. A waste of time however, where we mistake the character of our patient is of small account in comparison with the loss of their confidence. If we undertake to coax a patient whom we should drive, or to drive a patient whom we should coax, they lose, almost unconsciously to themselves, a certain confidence in us which it is impossible for us to restore. This in itself is sufficient reason why each dentist should carefully study temperaments, so that combining this knowledge with his knowledge of physiognomy he may know at a glance the general disposition of his patient.

Again, a knowledge of temperaments is of importance in the diagnosis of present disease and in foretelling those to which the patient is particularly subject. It may indicate the treatment required or the filling material most suitable.

Authorities have usually recognized four temperaments. The Sanguine, supposed to be dependent upon a predominance of the circulatory system.

The Bilious, supposed to be produced by a predominance of the liver and biliary organs.

The Lymphatic, where the fluids of the body are conceived to be in too large a proportion for the solids.

The Nervous, where the nervous system is greatly predominant.

It is not my purpose to attempt to prove that this classification is correct, nor to show that, because a man belongs to what we would call the bilious temperament he necessarily has a surplus of bile in his system. It is my opinion, however, that if we adopt this most common classification we shall be able, even in this country of mixed nationalities, to distinguish which temperament predominates in any particular individual. I say predominates, for it is seldom that we find a person in whom one temperament alone is manifest. The general characteristics of the temperaments may be described as follows :

Sanguine.—Ruddy complexion, good shape, firm flesh, light hair, fair skin, blue eyes, animated conversation, quick conception, ready memory, in disposition positive, self-confident, cheerful, prompt of action and opinion ; though these traits are likely to be modified by policy. He is likely to become a leader, but acquires ascendancy by mere force, using such knowledge as may be at hand.

Bilious.—Dark hair and eyes, skin of a brown color inclining to yellow, body moderately fleshy, muscles firm and well marked, temper abrupt, firm inflexible character, keen, calm, conscious of reserved power. He also is likely to be a leader; but gains position by deliberate calculation rather than by dash. It is among the possessors of this temperament that the greatest virtues and the greatest crimes are met with.

Lymphatic.—Soft flesh, pale skin, fair hair, figure rounded but inexpressive, muscular motion sluggish, deficient in force, general attitude indolent, manners somewhat gay but inclined to be insipid, prefers to be led rather than exert himself to lead.

Nervous.—Small soft muscles and generally slender form, complexion usually crimsoned, motions and senses quick, eye bright and restless, features mobile and expressive, disposition sympathetic and sensitive. This temperament is well represented in the walks of literature and art, but like the lymphatic shrinks from conflict, either mental or physical, still when provoked is spiteful and passionate. Being wrought up to great deeds only by the spur of excitement or opposition, they seldom become leaders, and seldom aspire to such a position.

These characteristics have been noted and made use of by the general practitioner; but there are other signs which we as dentists may use; in fact must use in order to attain the highest success. If we carefully examine the mouth of a sanguine patient, we shall find the jaw of good size and the bone strong. The superior bicuspids are thrown out so that the dental arch resembles in shape a horseshoe. The teeth are of a yellow color, short, thick, rounded, nearly as large at the neck as at the cutting edge. They are of good quality, caries making slow progress in them. The teeth of the upper jaw frequently close directly upon those of the lower, wearing them down and giving the person the appearance which our patients often describe as having "double teeth all round." We here find an inflammatory diathesis. Pulpitis, owing to the superior quality of the teeth is more rare than in the other temperaments; but when it does occur, is intense. Pericementitis is frequent and severe. The greatest care is required in extracting these teeth, as the alveolar process is of a very dense character and the teeth are very brittle. Especially is this the case in middle life.

Bilious teeth are of a dark blue color, longer than the sanguine, contracted at the neck, and widest at the cutting edge. In quality they would rank next to the sanguine. People of this temperament are peculiarly subject to disorder of the alementary canal. The pernicious effect of these troubles is often seen in the teeth.

Lymphatic teeth are of a light color, but have a yellow tinge. They are but slightly contracted at the neck; considerably longer than the sanguine, and of much poorer quality. Chronic alveolar abscess and ulitis are frequent, causing the teeth to loosen and fall out.

Nervous teeth are also light, but have a blue tinge; are contracted at the neck; are longer than any of the others, and are broadest half way between the gum and the cutting edge. The fissures are deep and the cusps pointed. They are very frail and often imperfectly formed. In all but the sanguine temperament the bicuspids are drawn in. Especially is this the case in the nervous.

To the mechanical dentist these rules are also of importance. Either from ignorance on the part of the dentist, or from allowing the patient to choose, red-headed teeth are daily being inserted in black-haired mouths.

Close study and observation together with a freely expressed opinion that we, better than the patient, know what teeth are suitable, will enable us to avoid this mistake. Let those persons who want "a set of teeth and a chromo for five dollars," or who insist upon selecting the teeth, go. We can not afford to trust our reputation with them. If the next time we meet them there is a strong suggestion of inscriptions and epitaphs, we have the consolation of knowing that it was not caused by our ignorance or avarice.

BROCKPORT, N. Y.

CROWDED DENTURES.

BY HENRY S. CHASE, M. D., D. D. S.

General Practice.—I have had a large dental practice for thirty-six years. My experience ought to be worth something to younger members of the profession, and it is for such only that I write.

In the mouths of nearly all persons, twenty years of age, if there exists dental decay at all, it will also be found that the bicuspids are affected on their proximate surfaces. I have found these teeth to be the most difficult to save by plugging. If the molars and bicuspids are in close contact, decay more surely ensues. If these teeth are separated enough to allow a thread to pass between their proximate grinding surfaces without pressing them, they are much less likely to decay. Pressure of one tooth against another, promotes and hastens decay. I find that when the second bicuspid has been extracted at the age of thirteen, fourteen or fifteen years, the first bicuspid, canine and first molar remain in good condition for life, other conditions being favorable. When this bicuspid is thus extracted, the first bicuspid and first molar move towards each other, and fill up the cavity in from three to five years. The earlier the extraction takes place, the less likely the molar is to *tip* toward the bicuspid. It is best to make the extraction at the thirteenth year. I would extract the first bicuspid on each side of the mouth, and in both jaws.

Modifications of Practice.—If the first molar is so much decayed that it will not probably last till forty years of age, then it is to be extracted instead of a bicuspid. If the first bicuspid is decayed at all, while the second one is sound, then the first one is to be extracted. It is not necessary that corresponding teeth should be extracted. A molar may be extracted on one side of the mouth and a bicuspid on the other; or a second bicuspid on one side and a first bicuspid on the other. If any one of these teeth have a dead pulp, I would choose it for extraction, other conditions being equal. When the jaws are full of teeth, it is very foolish to make it a rule to save every one of them.

If the second molar of the *under* jaw is badly decayed in the mouth of a sixteen or eighteen year old person, and the anterior teeth are so they can be preserved, I would extract that second molar. In a short time the wisdom tooth will come, and take a position in almost the same place occupied by the extracted one. Although these teeth are so generally defective on their grinding surfaces by reason of enamel crevices, yet they last as well or better than any other molars if properly cared for by the dentist and patient.

In the regulation of children's teeth, extraction should be freely and intelligently resorted to. Of what value is a *full* arch of decayed teeth, in comparison to a less number of well preserved teeth?

Let us get rid of the foolish notion that "it is wicked to extract a sound tooth, because the Creator placed it in the jaw for a wise purpose." According to such logic, it is wicked to cut the hair from our heads, or to shave it from our faces. Let us use our common sense and be practical. It is better to avoid disease than it is to cure it. It is better to preserve the teeth from decay, than it is to try to save them from destruction after decay has once set in.

The causes of crowded dentures is an interesting subject for discussion. I have, on former occasions, considered them at considerable length, but have not space at this time to review them.

St. Louis, Mo.

NASMYTH'S MEMBRANE.

I.

If the crown of a tooth be subjected to the action of very dilute hydrochloric acid for about twenty-four hours, the delicate membrane, first observed by Nasmyth (*Nasmyth's Membrane*), will be detached. It may, however, even without the employment of acid, be demonstrated by suitable sections of the enamel, as a transparent layer with a sharply defined exterior.—Wedl, in *Pathology of the Teeth.*

II.

Under the names of Nasmyth's membrane, enamel cuticle, or persistent dental capsule, a structure is described about which much difference of opinion has been, and indeed still is, expressed. Over the enamel of the crown of a human or other mammalian tooth, the crown of which is not coated by a thick layer of cementum, there is an exceedingly thin membrane, the existance of which can only be demonstrated by the use of acids, which cause it to become detached from the surface of the enamel. When thus isolated it is found to form a continuous transparent sheet, upon which, by staining with nitrate of silver, a reticulated pattern may be brought out, as though it were made up of epithelial cells. * * * * * *

In sections of an unworn bicuspid which was treated with acid subsequently to its having been ground thin and placed upon the slide, I have several times been fortunate enough to get a view of the membrane *in situ ;* it then appears to be continuous with an exterior layer of cementum, which becomes a little discolored by the acid employed to detach Nasmyth's membrane from the enamel. I am therefore inclined to regard it as young and incomplete cementum, and to consider it as representing (upon the human tooth) the thick cementum which covers the crowns of the teeth of Herbivora; and I am very glad to learn from my friend Dr. Magitot, who has made many as yet unpublished researches upon this subject, that he entirely concurs in this view, which has also the support of Professor Wedl.—TOMES, in *Dental Anatomy.*

III.

About twelve months ago a friend of mine, and a brother microscopist, ordered from London a low-angled one-quarter inch objective; my friend was engaged in histological investigations, and felt the need of a reliable medium-power glass. He had been told that wide-angled glasses, although very suitable for the purposes of the diatomist, were hardly suitable for the work he had in hand; he was told, too, that the thing needed was a glass of low or moderate angle, say from 50° to 70°, and one that had great working distance; in short, as the saying goes, he needed a good "working glass."

In due time the objective was received, and one very pleasant evening my friend called on me expressly to show the work of the lens. I remember that we had a very enjoyable time, amusing ourselves by looking over a variety of specimens suitable for the glass. In the course of the evening he exhibited a beautiful section of a human tooth, and placing the same under the 1-4th, called my attention to the "Nasmyth's membrane," described by Frey and others.

This was a matter of interest to me, for I had heard much of this "Nasmyth's membrane;" I had examined human teeth time and time again with my own wide-angled glasses, but had never been able to discover the same. I was, in fact, somewhat curious about the matter. It seemed odd, to say the least, that my glasses, which would show me, clearly and accurately, lines as close as 120,000 to the English inch, should fail to show me the existence of a membrane said to be about 1-6000 of an inch in thickness; and then again I had hunted with a low-angled 1-4th of my own without success. Hence it was with expectancy and interest that I put my eye to the tube; I saw a decided thickening of the margin of the crown of the tooth, and was informed that this was the veritable "Nasmyth." "But," said I, "is this thickened edge not the fault of the objective, and suppose that we examine the specimen with another glass?"

Removing the London lens, I substituted a wide-angled 1-6th of plus 180° of aperture, and on adjusting carefully to the thickness of covering glass, I soon had a splendid view of the preparation, by far finer than that shown by the London glass; and as I had supposed would be the case, I now had a nice clean edge in the place of the thickened one before mentioned. The superiority of the definition over that of the 1-4th was apparent; and the capacity of the 1-6th to bear the 1-4th inch solid eye-piece and amplifier—thus carrying the amplification up to nearly 4,000 diameters—was in a few moments demonstrated, but the Nasmyth's membrane was not to be seen under any amplification.

At this time it occurred to me that I might possibly *make* a membrane as described by the books, and as shown by the London lens. Turning the collar of the 1-6th so as to throw the glass considerably out of adjustment, and again focussing the object, I was much amused to find that I had the identical membrane, as shown by the imported glass, and also, that as the collar was moved, the membrane could be made thick or thin to suit!

The result of this little episode was simply this—my friend now owns and uses on *histological* work an American made 1-6th of 180° of aperture.

I have related, as briefly as possible, this little incident, and exactly as it occurred. I desire to say, however, that I do not deny the existence of "Nasmyth's membrane," described in the various works on physiology and histology. Nevertheless candor compels me to state that I have in times past made diligent search, and have failed to recognize a structure which is taught, even in our elementary school books, as if it were a commonplace thing!

Months ago it occurred to me that the membrane referred to might only be found on teeth of the first dentition, and obviously would be found wanting on the tooth of an adult. This idea sent me to the dentist's office; such specimens were procured, but the "Nasmyth" still defeated my search therefor.—SMITH, in *American Journal of Microscopy.*

Tecum fibre, a substance said to resemble "hair from a blonde wig," is used by some of the profession for polishing teeth and fillings.

A CYCLOPÆDIA OF PRACTICAL DENTISTRY.

A history [of Dentistry] is important, and it may be indispensable, but it cannot take the place of a full reference-book to authorities in the ten thousand questions which arise in matters of practice. It will assist, but cannot be full and explicit on all points of inquiry. Yet a cyclopædia would be of less account without a history to refer to; and a history would be of little importance if its statements of facts could not withstand the critical questionings implied in the work of the cyclopædia. A cyclopædia is not only an index to a history, but to all the sources, in practical matters, from which the history was compiled; and it accomplishes much more; it is, in fact, a full exposition of the science and art as well. It is an index to much of that which is necessarily excluded from a history as irrelevant, if not unimportant; and in the instance of the work advocated, should not only be in itself a digest of all information practically useful and therefore valuable, but should contain full references to all authorities on every subject of which it treats. If it excludes all that is doubtful, it will have the higher value of being a condensation of all that is certain; and justify the fact again, that knowledge is two-fold, consisting not only in an affirmation of what is true, but the negation of that which is false; and herein it would perform a service by guarding against the reproduction of old ideas as new. While it ought not to be a repository of patents (since it must discourage them), it would record all the inventions and improvements which have been freely given to the profession, and give due credit to the authors; and in every case, whatever has contributed to advance the interests of dentistry in any way, the source from which it was derived would be searched out and made known, at least so far as dental literature could furnish it.

In conclusion, I would remark that the rapid development of resources in dentistry, no doubt is to be attributed to the increase of its literature, the free discussion and dissemination of thought, in reference to those things which commonly engage the attention and best efforts of its practitioners. The effect has been to enlarge and perfect the means for overcoming the difficulties with which it contends, and to lessen the labor by which its best achievements are attained. The tendency has been in strict conformity to the spirit of the age in which we live, and that we well know is to lessen the sum of human labor as well as to enlarge its boundaries.—McGregor, in *Trans. of Dental Society of State of New York.*

ALVEOLO-DENTAL PERIOSTEUM.

The dental periosteum is a thin membrane interposed in the alveolus between the tooth and its socket, and intimately adherent to the cement which it covers throughout its surface. Formed by the thickened external envelope of the follicle, which we have seen fixed to the neck of the tooth, it derives its origin at this latter point, and there takes on a very strong adhesion to the gingival tissue, of which it appears to be merely a continuation ; a fact which, in the operation of the extraction of the teeth, sometimes causes laceration of the gum when care has not been taken to isolate the tooth from the soft parts. It proceeds thence towards the tip of the root, sending out here and there loose attachments to the alveolar wall, and, arrived at last at the tip, meets the vessels and nerves of the tooth, upon which it spreads itself in the manner of a sheath, and does not turn back, as has been believed, into the dental canals and cover the surface of the pulp. These vessels, therefore, are not accompanied by the periosteum in their passage to the interior of the tooth, but are in immediate contact with the ivory.—Magitot, in *Treatise on Dental Caries.*

DENTAL DECAY—A REMARKABLE FACT.

As regards now-existing races tooth-decay is much more abundant among the highly civilized than among savages, though the scale of gradation is by no means even and unbroken. But what is remarkable is the fact that the poorer classes in highly civilized communities are those who suffer most of all. In this country the laboring classes in purely agricultural districts are afflicted with caries of their teeth beyond all others. I make this assertion after very considerable observation.—Salter, in *Dental Pathology and Surgery.*

CONDUCTORIAL.

SALUTATORY.

The Odontographic Journal is the last of the many dental publications that have been forced upon the attention of a much afflicted profession. A majority of these publications have come to a timely end, while a number of the most deserving still live and persist in their stated visits to the private office. The fate of the present modest adventure is hidden in the future. If it thrive, its projectors will have reason to be thankful; if it die, the reader may rest assured that its grave will be watered with anything but tears.

It may be asked—what need of a new journal? To this question the reader must frame his own answer. We make no apology for its appearance, likewise no attempt to conceal one of the objects of its issue. The publishers, as is well known, deal in dental goods; in other words, they "have something to sell." It is their desire to bring this fact more directly, than could otherwise be done, to the attention of the dental profession; and it is their purpose to do this through and by means of the advertising pages, with which we have nothing to do.

In conclusion, we have the word of the publishers, who are men of means, that the journal will be issued quarterly for one year; that it will be mailed promptly the first days of April, July, October and January; that at the end of the year (provided the gods favor us), it will be enlarged and continued as a quarterly, or increased in size and issued as a monthly. Its success in its present form will determine these things in the time stated.

NASMYTH'S MEMBRANE.

On another page may be found three extracts on this subject, two of them from authors whose names are well known to and honored by the profession, the third from an accomplished histologist unknown, however, to dentistry. The first and second tell very briefly what this "myth" is and how it may be demonstrated; the third tells what it may be, or what it may be made to be, and how, as in the case of the professor's friend, the ghost of a demonstration may be had to order.

Prof. Smith, in explanation of that part of his lecture from which the extract in question was taken, says: "My initial remarks, in which the 'Nasmyth's' membrane if the books was discussed in a somewhat discursory manner, were intended as an example, and to give you an illustration in reference to a radical evil, which has in times past tainted the observations of many who use the microscope—I refer to diffraction lines and diffraction borders. To avoid these spectral, illusory appearances, is a consideration of the very first importance, etc."

And while the microscopist, particularly in cases where there is room for doubt, should give great attention to the means of observation, he should not forget to give some attention to the condition of the thing observed. Prof. Smith's means of observation were perfect; the condition of the thing observed, however, was not such as one in search of so delicate a structure as Nasmyth's membrane, and knowing what he sought, would have it, Prof. Wedl to the contrary notwithstanding. To us Nasmyth's membrane is a fact; it may be found on all unworn human teeth; it is found on some; it is demonstrable *in situ;* it is demonstrable detached from enamel; it is demonstrable attached at one part and detached at another. At another time, possibly in another place, we shall have more to say about this "pesky" thing, and the methods whereby its presence may be demonstrated.

CELLULOID.

This material is now so generally used as a base for artificial teeth that it becomes a matter of some importance what variety of celluloid is best adapted to that purpose.

It may not be known to many that there are two varieties of celluloid in the market—the *translucent* or *horny*, and the *opaque.*

Also that the latter is superior to the former in every respect save, perhaps, one—it is a poorer substitute for porcelain gum.

Some years ago the opaque variety was in demand, and was readily obtained in quantities sufficient for the time; but until very recently it had come to be regarded more as a curiosity than as a good thing for dental plates. The fact that the Celluloid Company continues the manufacture of the translucent or horny variety in great quantities, shows that there is a correspondingly great demand for it by the profession, and that both company and purchasers are at least fairly satisfied as to its working and wearing properties. That this is the position of the company is, we think, quite apparent in the printed matter so generously circulated throughout the country. But if any doubt exist on this point it is entirely dispelled by correspondence which certain of our friends have had with one of the company's officers, by whom it is claimed that the variety herein objected to is the result of many costly experiments, and is such as the manufacturers can safely recommend for dental purposes.

Now, while it is probably true that in the company's laboratory the translucent or horny variety is the best of their product, every day observation of plates of both varieties proves conclusively that for our use it is not just what we want.

A summary of the working and wearing properties of the two varieties may show why we have written as above: The translucent or horny variety is difficult to mould, difficult to repair, wears rough or scaly, discolors in most mouths, and in many cases becomes positively offensive to the senses of taste and smell. The opaque variety, on the other hand, is remarkably easy to mould, easy to repair, wears neither rough nor scaly, discolors only at the surface, and rarely becomes offensive. And this is not so much the result of personal experience, as of conclusions arrived at through the combined experience of three of our dental friends, who have used celluloid exclusively for seven, eight and eight years respectively. It may be asked—how do these gentlemen use the material? We answer, the first and second use steam, the third, dry-heat. In the course of our own experience, we have used oil, glycerine, water, and dry-heat so called. We agree with the company, that glycerine and steam are best—dry-heat being simply another name for steam-heat limited in quantity and poorly applied.

In conclusion, let us state that we have nothing against celluloid as such, nor as a material for artificial dentures; but against the translucent or horny variety of celluloid as compared with the opaque, we have much by way of condemnation.

NEW DISKS.

For about two months we have used celluloid disks for polishing chiseled and filed surfaces of teeth and fillings, and have found them cheap and durable, and sufficiently elastic to "shoot around a corner." This elastic property makes them superior in one respect to the justly celebrated diamond disk, which they supplement very satisfactorily.

In the last number of the *Missouri Dental Journal*, Dr. J. G. Harper gives the details of the manufacture of disks from a mixture of rubber and corundum, the proportions being enough of the latter material to make the whole mass weigh three times as much as the former. In the centre of the disk he vulcanizes a piece of gauze to give it greater stability. Brass moulds or moulds of plaster lined with heavy tin may be used, or sheets of the vulcanized material may be cut in the rough, fixed in a mandril and trimmed down by means of sand-paper. Several in attendance at the meeting at which the paper was read, and who have used these disks, spoke very highly of them.

THE PROPER WORD.

It is suggested and recommended by the editor of the *Dental Cosmos*, for reasons given at length by the eminent philologist, Dr Joseph Thomas, that the profession discard the words "proximate," "proximal" and "approximate," to denote the contiguous surfaces of adjoining teeth, and adopt in their stead the word "approximal." Dr. Thomas deems it "not a small recommendation of 'approximal' that it corresponds in termination with so many other dental terms denoting position or relation, as mesial, distal, etc."

HYDROBROMIC ETHER.

Bromide of ethyl, bromic ether, or hydrobromic ether, is spoken of as a desirable substitute for chloroform, and the ether in common use, in cases where it is necessary to effect general anæsthesia. According to Dr. Lawrence Turnbull it is safe, rapid in its action, readily eliminated from the system, more agreeable in oder and taste than ordinary ether, rarely excites vomiting, is not inflammable, costs about thirty cents an ounce, and can be procured pure of John Wyeth & Bro. Numerous experiments seem to substantiate all that is claimed for it.

STAMP YOUR DENTIFRICE.

Dentists and others who sell dentifrice, whether in the form of powder or liquid, should see to it that every package is properly stamped. The U. S. government exacts a tax of one cent for each and every twenty-five cents worth, or fraction thereof, sold ; and neglect to comply with the requirements of the law renders the seller liable to a fine of fifty dollars for each offence. The fact that large packages have been stamped by the dealer does not relieve the one who breaks such packages and sells their contents in smaller lots. He must stamp again.

NECROLOGICAL.

SAMUEL STOCKTON WHITE, D. D. S.

Died, at Paris, France, December 30th, 1879, of congestion of the brain, Dr. Samuel Stockton White, in the 58th year of his age.

In view of the publication by our cotemporaries of extended notices of the life, character, professional and commercial attainments of Dr. White, it were presumption in us to attempt anything further with the expectation of adding to the esteem in which he was held by dentists the world over. With others we regret his comparatively early demise, and tender our sympathies to those who necessarily most keenly feel his loss.

BIBLIOGRAPHICAL.

THE AMERICAN MONTHLY JOURNAL OF MICROSCOPY. Editor and Publisher, Romeyn Hitchcock, F. R. M. S.

This little journal starts out with a good table of contents also the assurance on the part of the editor and publisher, that future numbers will prove equally if not more interesting and attractive. It is published in New York, at one dollar a year.

THE AMERICAN JOURNAL OF MICROSCOPY. Published by the Industrial Publication Co., N. Y.

This monthly is now in its fifth year, and if we may judge from the contents of the numbers so far issued, is determined to sustain its well earned reputation. Like the above named periodical, its cost is one dollar for twelve months.

As these are the only journals in this country devoted to microscopy, it will pay any one interested in this subject to always have them at hand. Both are fully and handsomly illustrated, and contain much of the best work of American and foreign investigators.

USEFUL WORKS BY STATE DENTAL SOCIETIES. In 1877 the Illinois State Dental Society brought out a tract entitled "*Our Teeth; Their care and treatment*," &c., designed "*especially for family instruction*," 16 mo., pp. 24. Published by C. Stoddard Smith, at Elgin.

Last year the Wisconsin State Society published a work, by Arthur Holbrook, entitled "*Practical Information about the Teeth. A Book for the People*:" 16 mo., pp. 200: Milwaukee.

The Societies which auspicated these works and assumed the responsibility of publishing them, doubtless did a great service to the profession, as well as the public. If the first treatise was small, it contained most of what the public cares to know, and can be read and digested at a single sitting by any one of average education and good sense, with decided advantage. The other has more pretention, for it has the proportions of a book. It belongs to the order of *popular science primers*, but is likely to be as useful to the average dentist himself as are some text-books. It covers the field very completely; and we hardly know which to commend most, the clearness and precision with which Dr. Holbrook schemed and wrote to supply a real want, or the admirable dress in which his work was produced and illustrated through the sagacity and enterprise of the Wisconsin State Dental Society. It is not within the scope of this notice to comment on one other work of the same class, and having strong claims to an equal, not to say superior importance, in some respects, to both of the others: for it is published as a private venture, in which no organized society of dentists has any interest. It is published for profit; the others were not Their works were not compensated, save in honor--only the printer received due pecuniary reward. We are writing to what dental organizations have done *for themselves* and the *public*, in untried walks; and we propose to make more than a book-notice of their accomplishments, and the possible achievements yet to be accomplished by such organizations, in some future article. X.

FILINGS.

The Dental Society of the State of New York meets at Albany, May 12th.

The Seventh District Dental Society will hold its annual meeting in this city the last Tuesday and following Wednesday in April. The business committee is at work, and there is every indication of an unusually interesting session.

A British naval surgeon, Dr. Beveridge, states that for foreign bodies in the throat, such as pieces of meat, etc., a simple mode of relief is to blow forcibly into the ear. This excites powerful reflex action, during which the foreign body is expelled from the trachea.

A Wisconsin dentist recently received the following from a patient writing for advice: "My mouth is three inches across, five-eighths inches through the jaw. Sum humoky on the edge. Shaped like a horseshew, toe forrard. If you want me to be more partikler I shall have to cum thar."

In a communication to the French Academy, Cyon claims that the eighth pair of cerebral nerves contain two nerves of entirely distinct senses—the auditory and the nerve of space ("Raumnerf"). He considers the latter the source of all our ideas of extension, and of the three dimensions of space.

In a cave near Decatur, Ohio, were recently found, imbedded in ashes, fragments of human bones, pieces of pottery, also bones of wild animals, shells, etc. According to a correspondent of the Marietta *Register*, the human jawbones found in this cave are very large, and have the teeth well preserved. They have one tooth back of the "wisdom-tooth." All the long bones were broken or split—a probable indication of cannibal practices.

Dr. B. W. Wilkerson, of Wilkerson chair fame, and junior editor of *The Independent Practitioner*, has undertaken the preparation of "A Directory, History and Biography of Dentistry of the World." The reader is requested to send him his printed or plainly written professional card, with degrees, titles and honors. He is also requested to answer the following questions: What is your native tongue, and with what langugages are you conversant? What colleges or institutions have you attended? Of what societies, if any, are you a member? What office, if any, have you held in either?

A monkey in the Alexandra Palace, London, had a decaying tooth, and suffered from a large abscess in the lower jaw. It was decided to extract the tooth, but, as the animal was at times very vicious, it was thought that chloroform would have to be employed. He showed fight on being taken out of his cage, and struggled hard against being put into a sack, snapping and screaming at the attendants. But so soon as the dentist managed to get his hand on the abscess, and so gave a little relief, the monkey's demeanor changed entirely; he laid his head down quietly for examination, and quietly submitted to the removal of a stump and a tooth.

The death is announced on the 19th of December last, of Francis Boll, Professor of Comparative Physiology in the University of Rome. Though young, Prof. Boll had contributed effectively to the advance of medical science by his physiological researches.

Dr. B. W. Richardson has recently introduced two caustics—sodium and potassium alcohols. When applied to the skin these alcohols are said to cause "gradual destruction of tissue, which may be so moderated as hardly to be perceptible, and may be so intensified as to act almost like a cutting instrument." These caustics will dissolve opium like ordinary alcohol, and their action can be stopped immediately by dropping on the eschar a little chloroform, which decomposes the caustic into chloride of the metal and methylic ether, which is inert locally.

At a recent meeting of the Odontological Society of Great Britain, one of the members exhibited a photograph of a Hindoo bas-relief, representing a group of monkeys engaged in extracting a man's tooth. The unfortunate individual was bound and the tooth was held in the grasp of a very primative-looking extracting instrument, to which a small elephant was attached by means of tackles. This piece of sculpture was found in a ruined temple near Allahabad, known as the Stupa of Bharhut, and was more than 2,000 years old, the temple having been built about the year 300 B. C.

The following was cut from the telegraphic columns of the *Rochester Morning Herald:*

West Union, Iowa, Feb. 18.—Yesterday Mrs. Dr. Godshaw had a troublesome tooth extracted by her husband and in less than one hour she was dead. Mrs. Godshaw was in her usual health and the case is somewhat singular.

What the tooth had to do with the death of the lady does not appear in the verdict, which reads as follows:

STATE OF IOWA, } ss.
Fayette County, }

An inquest holden at West Union, Fayette county, State of Iowa, on the 17th and 18th days of February, before L. Armstrong, Coroner, upon the dead body of Ella Gottschall, there lying dead, by the jurors whose names are hereto subscribed. The said jurors upon their oaths do say that the said Ella Gottschall came to her death feloniously by the procuration of abortion and other violent treatment on or about the 17th of February, 1880, at West Union, Fayette county, and from the testimony taken in the case before us, we believe that one A. Gottschall, as principal, and Chauncey McCoy, accessory, are guilty of the crime of murder of Ella Gottschall.

In testimony whereof the said jurors have hereunto set their hands, this 18th day of February, A. D. 1880.

John H. Donald, }
B. W. Finch, } Jurors.
Mark Gilbert, }
Attest: L. Armstrong, Coroner.

According to accounts given by the local papers, the victim was far from being a willing party to the crime. Brutal treatment on the part of her husband compelled her to submit. The accessory to the crime was discharged shortly after arrest; the principal "languishes" in jail.

The Independent Practitioner is a new journal devoted to medicine, surgery, obstetrics and dentistry, and edited by Harvey L. Byrd, A. M., M. D., and B. M. Wilkerson, M. D., D. D. S. It is published in Baltimore, Md., issued monthly, contains sixty or more pages, and costs two dollars a year.

WE MANUFACTURE AND KEEP IN STOCK

ALL GOODS USED BY DENTISTS,

——OUR SPECIALTIES ARE——

Office and Turning Lathes,
Adjustable Dental Brackets,
Articulators, Flasks, Lamps, &c.,
Iron Base Dental Chairs,
Dental Registers,
Appointment Books,
Sterling Amalgam,
Caulk's Diamond Cement,
Plastic Flint Stopping,
Sterling Gold Foil,
Tooth Powder,
Tooth Powder Jars,
Sterling Rubber.

THE LARGEST VARIETY & BEST STOCK OF TEETH.

Discounts made to those buying an Outfit.

SEND FOR PRICE LIST.

DAVIS & LEYDEN,
91 & 93 State St, Rochester, N. Y.

Estate of Dr. Sam'l S. White, deceased.

Letters Testamentary upon the above Estate having been granted to the undersigned, all persons indebted to said Estate are requested to make payment, and those having claims or demands to present the same, without delay, to

J. CLARENCE WHITE,
S. S. WHITE, Jr.,
Executors,
S. E. corner of 12th and Chestnut Streets,
Philadelphia.

CONTINUATION OF THE BUSINESS.

The undersigned, having been appointed, under the will of Dr. S. S. White, Trustees to carry on the business, announce to the patrons and friends of the house that they have accepted the trust, and propose to continue the manufacture, importation, and sale of Dental Supplies, substantially as heretofore.

Having been associated with the house for many years, and actively engaged in the manufacturing, selling, and financial departments of the business, we feel ourselves thoroughly acquainted with its various branches, and will strive to maintain the reputation of the establishment as the leading Dental Manufactory and Depot of the world.

The endeavors of Dr. White to improve the practice of dentistry by placing in the hands of the profession the most perfect instruments and appliances, and by constantly encouraging and bringing out improvements and new inventions, will be kept steadily in view and followed to the best of our ability.

By the use of the best materials, by the most careful supervision and inspection of every department of manufacturing, and by sparing neither expense nor trouble, we propose to produce the *best* dental goods that can be made.

By considerate treatment of and fair dealing with our customers, by furnishing the best goods at the lowest prices consistent with quality, and by care and promptness in the execution of orders, we hope always to retain the confidence of the profession and the trade.

JAMES W. WHITE,
J. CLARENCE WHITE, } *Trustees,*
HENRY M. LEWIS,

PHILADELPHIA, NEW YORK, BOSTON, CHICAGO.

CAULK'S
DIAMOND POINT STOPPING
AND DIAMOND POINT PELLETS.

This form of **Gutta Percha** is now in general use, having been in the market for several years, and is considered to be the best ever offered to the Dental Profession.

It stands a *higher heat test*, according to reports of the best authorities, than that of any other makers. (**Gutta Percha** wears well in proportion as it softens at a high temperature.) It is free from all foreign agents destructive to tooth substance or the tissues of the mouth, it will stand much attrition, and resist the fluids of the oral cavity generally.

It has been thoroughly tested in the *mouth*, and out of it in every conceivable manner.

It works and packs admirably, hardens rapidly and does not adhere to the instrument.

It is non-escharotic, and also a non-conductor of heat, making it valuable for capping pulps, filling roots, by dissolving it in chloroform, and for sensitive dentine. In fact we believe it possesses all the desirable qualities necessary for a filling material of this character, viz.: *toughness*, *hardness*, *durability*, *plasticity*, *uniformity and cohesiveness*.

TESTIMONIALS.

PHILADELPHIA, July 6, 1878.

The sample of Gutta Percha, IMPROVED DIAMOND POINT, that you requested me to test, I can say is an exceedingly good article. It is of the grade 205–210 degrees heat test, therefore preferably should be heated over water, is remarkably homogeneous, packs well and finishes readily. It is the BEST of its grade of any that I have tested. J. FOSTER FLAGG, D. D. S.

ST. LOUIS, MO., Dec. 24, 1878.

I like your Diamond Point Stopping better than any other Gutta Percha filling I have ever used, but would prefer it in pellets. C. W. SPALDING, D. D. S., M. D.

NEW YORK, Nov. 22, 1878.

I have tried your Diamond Point Stopping with great satisfaction, and believe that it promises to be the best I have ever used. It packs better, does not stick to the instrument so much, and seems harder. BENJ. LORD.

BALTIMORE, Jan. 13, 1879.

I have put your Diamond Point Stopping to various tests, both in the mouth and otherwise, and find it superior to any I have used heretofore. D. F. PENNINGTON, D. D. S.

NEWARK, N. J., Jan. 10, 1879.

I have used your Diamond Point Stopping for some time and like it very well indeed. In fact since becoming well acquainted with it, I have used no other. C. S. STOCKTON, D. D. S.

PHILADELPHIA, Feb. 8, 1879.

I like the working properties of your Stopping. It works smooth—free from grit,—is thoroughly mixed, and softens evenly throughout the mass—which I think is a very desirable property.
W. H. TRUEMAN.

ST. LOUIS, MO., Nov. 12. 1877.

Your Stopping makes a water-tight plug. It is the only Gutta Percha Filling I know of that does not contract in hardening. HENRY S. CHASE, D. D. S., M. D.

EUFAULA, Ala., Feb. 17, 1880.

I have been using your Diamond Point Stopping for some eight months, and find it all that you claim for it, if used according to directions. * * * Standing now for eight months in temporary molars (crown cavities), there is scarcely any perceptible wear, and I take pleasure in recommending it. T. M. ALLEN.

Caulk's Diamond Point Stopping when worked according to the directions, becomes harder and more resistant than any other similar material previously in the market.—Transactions of the Illinois State Dental Society, May, 1878.

☞ The Stopping is put up in sealed envelopes of 1-20, 1-10, 1-5, 1-4, 1-2 ounce, per ounce, $5.00. Pellets of assorted sizes are put up in sealed boxes of 1-20, 1-10, 1-5, 1-4, 1-2 ounce, per ounce, $5.00. Sent *free* to any part of the world on receipt of *price*.

L. D. CAULK, D. D. S., Manufacturer and Proprietor,
Camden, Delaware, U. S. A.

Sold at all Dental Depots.

For sale by DAVIS & LEYDEN, Rochester, N. Y.

PREMIUM GOODS.

These are fully equal in quality to any of their respective kinds, and are *surpassed by none made.*

Premium Rubber, - -	$3.50 per lb.
Premium Gutta Percha,	5.00 per oz.
Premium Amalgam, -	4.00 per oz.

Fractional lots of any of the above articles will be sold, postage pre-paid, as specimens, as ¼, ⅛ or ½ pound or ounce.

If you would like a *sample* of our

NEW CONE SOCKET SYSTEM OF INSTRUMENTS,

SEND for a well-tempered Excavator, with ornamented, nickel plated handle—A,	18 cts. in postage stamps
SEND for a well-tempered and serrated plugger, with ornamented, nickel plated handle—B, - - -	45 cts. in postage stamps
SEND for a fine Burnisher, with ornamented, nickel plated handle—C, -	48 cts. in postage stamps

Only one of each of the above can be sent at the prices named, but the goods at regular prices, will not for a full outfit, average more than the usual price for steel-handled goods.

Illustrated Circular sent with sample.

JOHNSTON BROTHERS,
1260 Broadway, N. Y.

JOHNSTON BROTHERS,
1260 Broadway, N. Y.,

Request attention to the fact that they supply every variety of Dental Goods; manufacturing very largely the more important articles.

Their manufactures, they *know* are made of the *very best materials* that can be obtained in this market or in Europe, regardless of price, and they *believe* them unequalled in design either as regards *utility*, *beauty* or *workmanship*, and they invite a comparison of prices. Especial mention is made of the goods below named—as of our own manufacture—and every article the *best* of its class.

Wilkerson Dental Chairs, in Plush, Leather or Tapestry	**$175 to $220**
(Important improvements have been recently added.)	
Student's Morrison Dental Chairs	**$100 to $115**
Morrison Dental Bracket	**$25**
Johnston Portable Bracket and Spittoon	**$25 to $50**
Johnston Fountain Spittoon	**$60 to $70**
Johnston Dental Engine	**$40**
Johnston Cone Journal hand piece No. 2	**$7.50**
Johnston Right-Angle for No. 2 hand-piece	**$5.00**
Upright Surgeon Case for liquid Nitrous Oxide	**$36 to $44**
Nickel Plated Gasometer for liquid Nitrous Oxide	**$128**

Johnston's New Valve for Cylinders for liquid Nitrous Oxide.

Free to Dentists or Dealers, who agree that the Cylinders on which they are placed, shall only be filled by Johnston Brothers, and by no one else.

Johnston Cone Socket System for Excavators, Pluggers, Chisels, &c.

(Price List Furnished on Application).

—For Current Dental News,—
For Information of Improved Apparatus
For the Transactions of the British Odontological Society,

—SUBSCRIBE FOR—

Johnstons'
DENTAL MISCELLANY,

(Monthly). $2.50.

SAMSON RUBBER.

Trade Mark, No. 3788, Registered June 20th, 1876.

MANUFACTURED BY

444 FIRST ST.,

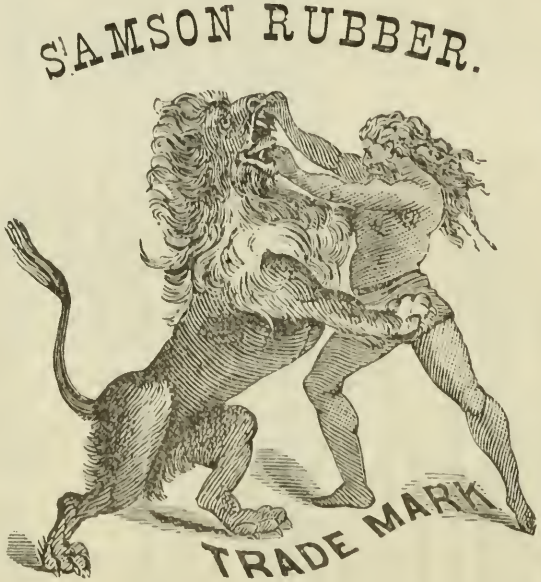
DENTAL RUBBERS.

——o——

PRICE,

Samson Rubber,

Per lb. $3.50.



EUGENE DOHERTY,

Brooklyn, E.D., N.Y.

DENTAL RUBBERS.

——o——

PRICES.

No. 1 Rubber, per lb.	$2.75
No 2 " "	2.75
Black " "	2.50
Gutta Percha "	2.50

Warranted to be the strongest and most uniform Rubber manufactured; vulcanizes same as ordinary Rubber.

(PATENTED JUNE 3, 1879.)

WEIGHTED RUBBER.

To the Dental Profession:

What is claimed for this Rubber is, its weight, strength and solidity. It takes the place of all metals now in use as a base for lower plates (not excepting continuous gum work). It is a non-elastic substance, superior to all other Rubbers now in use. It does not contract or expand, thus avoiding the breaking or checking of blocks after being vulcanized, or during the process of cooling. It packs much easier than any Rubber now in the market. There is no danger of this Rubber becoming porous, as is the case with other Rubbers. When extra thick plates are required, it vulcanizes the same as ordinary Rubbers.

We manufacture two kinds: No. 1, for lower plates; also, No. 2, which corresponds in color and appearance with No. 1; but is used exclusively for upper plates.

All pure metals can be introduced by our method, and will be manufactured to order only.

P. S.—This Rubber has now been in use for over two years, and has given entire satisfaction.

All orders, address

EUGENE DOHERTY,
No. 444 First Street,
BROOKLYN, E. D., N. Y.

For Sale by **DAVIS & LEYDEN,**
Rochester, N. Y.

GIDEON SIBLEY,

—MANUFACTURER OF—

PORCELAIN TEETH,

—AND DEALER IN—

DENTAL MATERIALS,

Salesroom, 921 Ridge avenue,
Factory, 917-923 Ridge avenue, } **PHILADELPHIA, Penn.**

Ever since we commenced inserting our

NEW PINS

and using our *New Material* in the manufacture of our

PORCELAIN TEETH,

we have been continually receiving Testimonials of their superiority and excellence.

The most Satisfactory Testimonial

of all, is the rapid increase in our sales, they having more than trebled within the last *Ten months ;* which we feel positive has never before been equaled by any other manufacturer in so short a space of time, thus showing conclusively, that our improvements have been appreciated.

NET CASH PRICE

GUM AND PLAIN RUBBER TEETH.

Partial Sets, - - - - - Eight cts. per Tooth.

Three cents postage additional on each order of less than 14 Teeth.

In Sets of Fourteen, - - - - - $1.00 per Set.

Postage free to all parts of the United States.

A liberal discount for amounts of $25, $50 and $100, or over.

Do not fail to ask your Dealer for them, or send to us direct, and give them a trial.

For Sale by DAVIS & LEYDEN,
Rochester, N. Y.

BLAKE & CO.,

MANUFACTURERS OF

DENTAL INSTRUMENTS,

Of every Description,

WHOLESALE AND RETAIL,

212 CHESTER ST., PHILADELPHIA.

Instruments of any Description

MADE TO ORDER.

ORDERS EXECUTED FROM ANY CATALOGUE PUBLISHED.

☞ Communications by Mail Promptly Attended to.

MEDAL AND DIPLOMA AWARDED

AT PHILADELPHIA, 1876.

WM. VALLEAU, JR.,

—MANUFACTURER OF—

CHEMICALLY PURE, SOFT AND COHESIVE

GOLD FOILS,

Wholesale and Retail,

506 BROOME STREET, - - - - NEW YORK.

ESTABLISHED 1849.

AKRON

DENTAL RUBBER

—ADDRESS—

AKRON RUBBER WORKS

AKRON, OHIO,

FOR SAMPLE AND PRICES.

THIS RUBBER IS A NEW COMPOUND OF FINEST QUALITY.

DENTISTS WILL FIND IT FOR THEIR INTEREST TO INVESTIGATE.

☞ PLEASE SAY WHERE YOU SAW THIS.

STERLING AMALGAM

The Sterling Amalgam now stands pre-eminent, as the best filling for teeth there is made (gold excepted). It is used by the best Dentists in every State in the Union, and their letters of endorsement and recommendation are received daily. It has been a surprise to many to find a first-class Amalgam which would always keep bright in the mouth and never wear out, that could be made for so low a price: yet they all agree that the **Sterling has no equal**, even among the high-priced fillings, which are so extensively advertised. There has always been quite a proportion of the Dental profession who have measured the value of Amalgam by the price that has been asked for it, but very many of these are now learning by experience that we are able to produce and furnish first-class Fillings, at prices in proportion to their value, in these stringent times.

We warrant the Sterling Amalgam to contain Gold, Silver and Platinum, and challenge comparison with any Amalgam made in this country or any other, as to its being more plastic, working easier, keeping brighter, does not shrink; looking and wearing the brightest in the mouth; wears the longest, is the toughest, and gives the best satisfaction to the patient of any ever made.

We guarantee every Package to give entire Satisfaction, and will Refund the money in every case where it does not prove as represented.

Price No. 1, Per Ounce	$3.00
Price 2-3 " "	2.00
Price 1-3 " "	1.00

The above is the same in every respect that we have sold for the last seven years.

But as we have a few customers who desire a very hard flint-like filling, which in an Amalgam has never been produced without an excess of silver, which always corrodes and oxydizes, our experiments have proved that by a judicious use of Platinum this can be overcome, but at an additional expense. This Amalgam is no better than No. 1, but in this respect.

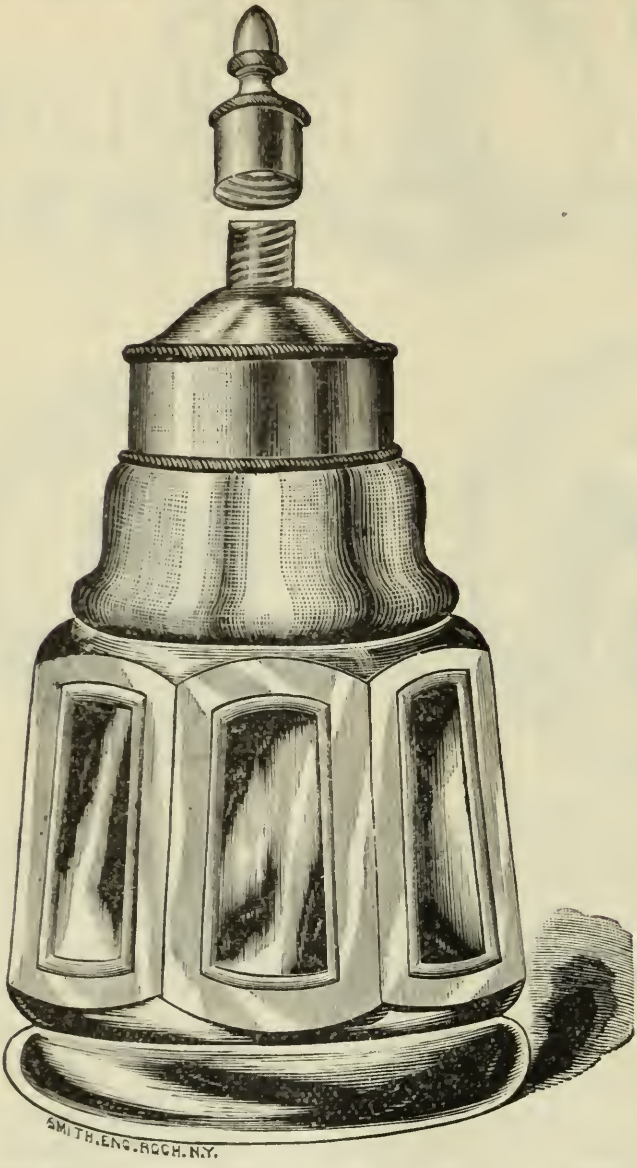
Price No. 2. Per Ounce,	$4.00
" " " " one-half ounce	2.00
" " " " one-fourth ounce	1.00

Sent by mail, post-paid, when cash accompanies order.

Kept at all Dental Depots.

DAVIS & LEYDEN, Rochester, N. Y.

TOOTH POWDER JAR.


SMITH.ENG.ROCH.N.Y.

THESE

METALLIC-TOP

TOOTH POWDER

JARS,

of the most approved and beautiful pattern,

are made by the best Glass Manufacturers, of the finest quality of Glass, in four different colors. The tops are ground off smooth, and fitted with cork joints, so as to make them air-tight. They have double screw metallic tops, made of the best quality of white metal, which does not tarnish or discolor.

They are the most convenient, beautiful and salable packages that powder has ever been put in. We have sold over 10,000 the last year, and find they give universal satisfaction.

They are put up in boxes for shipping, half-dozen in each box.

PRICES.

No. 1,	Best quality Pearl White Glass, - - -	Per Doz.	$2 25
" 2,	" " Flint " - - - - -	" "	2 00
" 3,	" " Blue " - - -	" "	2 00
" 4,	" " Amber " - - - - -	" "	2 00
" 5,	A new design 3 oz., metallic top, - - -	" "	1 50
" 6,	" " 2 " " " - - - - -	" "	2 25
" 7,	" " 2 " " " - - -	" "	1 00

All these Powder Jars are so made that Dentists can use their own labels on them.

DAVIS & LEYDEN,
Rochester, N. Y.

Tooth Powder.

This Powder will bear favorable comparison with the best made. The materials of which it is composed are the best that can be had; selected by one of the most reliable wholesale houses in the country; it has nothing in it that can in the least injure the teeth; tinted a light pink and perfumed either with rose or wintergreen.

One pound of Powder fills one dozen of our Powder Jars. Put up in tin cans, sealed tight, and stamped

One Pound Can,	$1 00
Five " "	3 50

Perfumed with Rose, extra per pound, twenty-five cents.

Sample Pound Cans sent by mail, post-paid, on receipt of the cash.

DAVIS & LEYDEN, Rochester, N. Y.

EXCELSIOR TOOTH COMPANY

—MANUFACTURERS OF—

Superior Artificial Teeth,

—DEALERS IN ALL KINDS OF—

DENTAL GOODS.

Sample Sets sent to Dentists on the receipt of $1.00.

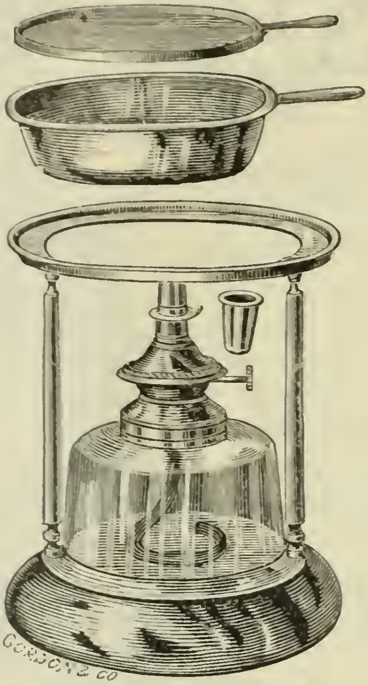
Special Inducements offered to the Trade

BIRDSALL & WAITE,

Whitney's Point, Broome Co., N. Y.

For Sale by DAVIS & LEYDEN, Rochester, N. Y.

Annealing & Hot Water Lamp.



This Lamp, made for the operating table, is beautiful in design and especially adapted to annealing Gold Foil, warming Gutta Percha Filling and heating water, which is always kept at an even temperature. It is neat and tasty and much admired; the cup for holding water is made of Brass, Nickel Plated, and large enough to hold all the water required. The Tray on which to anneal gold, is made to fit the same rim as that supporting the cup. The lamp is formed at the base into an oval Burr shape, made of heavy spun brass. The top and inside form a solid mould, conforming to the moulded shape of the lamp bottom. On two sides of this base are brass columns, riveted and soldered firmly; at the top of these columns a flat brass rimed band is securely riveted; this whole outside frame work is so thoroughly put together as to make it very firm and durable. The whole lamp is nicely polished and nickel plated. The Alcohol Lamp, of clear flint glass, has a double tube burner, with a well fitted ratchet which regulates the flame so perfectly that the tray or cup may be but slightly heated if desired. We use the woven wick; there is a tight fitting cap to guard against evaporation, when not in use. The convenience of warm water at the operating chair, as well as the Gold Annealer, is appreciated by all dentists, and this is the most convenient and compact as well as the most beautiful one made.

Price of Annealing Lamp, with Tray..................................	$3 00
" " Hot Water Cup, extra..	50

DAVIS & LEYDEN,
Rochester, N. Y.

THE

Odontographic Journal.

VOL. I.——*July*, 1880.——NO. 2.

NECROSIS.

BY R. H. HOFHEINZ, D. D. S.

Necrosis is a subject which I could not exhaust in the short space allotted me, had I the intention to give it a complete consideration from the histo-pathological stand point. I shall therefore only endeavor to give a brief and as far as I am able, precise description of this pathalogical condition, especially dwelling on those conditions as they present themselves to the dental profession.

Necrosis, which signifies death, is only applied to osseous structure, the similar condition in the soft tissues being known as gangrene any conditions which interfere with the supply of blood to a bone may be the cause of necrosis.

It would not be improper to divide the causes into two kinds: 1. Into those which interfere with the supply of the nutritive materials. 2. Into those which destroy quickly the histological elements of the tissues. Among the first causes we have mainly inflammatory processes; among the second, external violence and what is very important to us, phosphoric poisoning.

The arrest of nutrition is followed by a complete cessation of all evidences of life. Cartilage and bone resist the necrotizing process longer than any other tissue, and are therefore the least altered by it.

The bones, if dead, become a foreign body, and as such must be separated from the adjacent living tissue.

As a foreign body, it sets up inflammatory changes in the living tissue and is thus either ultimately removed, or as it often occurs in deep seated necrosis, becomes incapsuled.

The process of necrosis may involve greater or less extent of tissue ; it may diffuse over the entire bone ; it may become limited ; if it ceases, it becomes limited by inflamed tissue, known as the line of demarcation which separates the dead from the living.

So much for necrosis as a whole. Now let us consider those conditions which present themselves more frequently to our observation.

Necrosis was already known to Hippocrates, who writes : "That the son of Metrodorus after an extensive swelling of the gums, had to suffer from a painful process of ulceration, which resulted in the removal of a part of the maxilla, together with the teeth invested in it."

Necrosis of the maxillary bones, inferior ones being more subject to the attack, is the result of an interrupted supply of the nutritive element. The most frequent causes are : Intra-alveolar or subperiosteal abscesses, external violence, mercurial affections, gangrenous stomatitis and phosphoric poisoning.

Necrosis is liable to occur to all persons, more especially, however, to scrofulous children. It locates itself more frequently in the inferior maxilla in the vicinity of the molars.

The gum which covers the diseased bone has a bluish red appearance, becomes detached from the bone, and pus generally begins to escape between the gum and bony tissue. This condition remains until the sequestrum is removed by the above mentioned process.

According to some observers, no reproduction of bone takes place in the superior maxilla, whilst literature shows us that almost the entire regeneration of the inferior maxillary bone followed its necrosis.

Should the destructive process extend so far as to involve the inferior dental nerve, it may cause paralysis and neuralgic troubles ; it may also involve Steno's ducts ; yes, there are cases of death reported, caused by the settling of pus into the thoracic cavity.

Two more things remain for our consideration :

The Diagnosis and Cure.—It would be an easy matter to make the diagnosis could we always do so with our eyes, but as we very frequently, in fact most always, rely upon our sense of touch, it sometimes renders it difficult, as we cannot always depend upon the history of the patient. The manner in which the trouble originated facilitates the diagnosis. In case of carious bone the escaping pus is thinner, more serous ; in cases of necrosis thick, mucus like. In cases of caries the exploring instrument penetrates the bone to some extent, thus producing pain to the patient, whilst in necrosis the exploring instrument touches the fixed sequestrums, the operation being entirely painless. The treatment of necrosis consists mainly in keeping the fistulous opening clean. Some old writers have advocated dissolving the sequestrum chemically, which, however, is too irrational to deserve much attention, as the acid would not only dissolve the sequestrum, but also destroy the granulations of the living tissue, thus preventing replacement of the sequestrum.

There is nothing certain but the mechanical removal of the sequestrum. This should, however, not be done until detachment from the living bone has occurred. After the removal of the sequestrum, the fistulous opening must be kept clean. It will gradually fill up ; frequently, however, requiring a long time until the sequestered cavity becomes filled with ossifying granulations. If the patient is of feeble health, tonics are necessary, thus assisting the general replacement of tissue and promoting the granulating process.

Many times the fistulos opening does not fill with new tissue, owing to the great destruction or insufficiency of reproductive power of the bone element. Scraping the bone, and the actual cautery are recommended.

One more subject remains for our consideration, namely : Necrosis caused by phosphoric poisoning. The affection according to Albrecht, always occurs where the fumes of phosphorus have access to the membrane covering the bone. The saliva is the vehicle of the destructive poison and the lower jaw is therefore more subject to its necrotizing effects, as the teeth and alveolar processes are constantly bathed in it.

Bibra has noticed that the roots of the teeth have a similar appearance to those which for a long time were placed in muriatic acid, which would lead us to believe that the formed phosphoric acid dissolves the phosphate of lime, thus causing the destruction of periostum and bone.

Phosphoric necrosis begins generally with pain in one or more teeth, carious teeth being more subject to it. The gums around them become inflamed and swollen, and present a violet appearance, symptoms similar to those of mercurial poisoning.

This hypertrophied condition leads to the formation of pus. On examination, the exploring needle touches the hard impermeable bone, which after some time becomes loosened, and as a sequestrum and relatively foreign body, causes an inflammatory process as above ascertained. The teeth now become loose, owing to the destruction of the periosteum, and generally fall out.

Phosphoric necrosis very frequently proves fatal, death occurring through the ulcerative process, causing cachexy, or through secondary affections, as abscesses of the brain, etc. If expoliation of the dead parts takes place granulation and healing follow.

The treatment of this destructive disease consists mainly in removing the sufferer from all phosphoric influences, removal of all necrosed bone, nutritious diet and such remedies as assist nature in its grand work of healing.

ROCHESTER, N. Y.

THE ELECTRO-CHEMICAL THEORY.

BY S. B. PALMER, M. D. S.

If we can judge from discussions upon the electro-chemical theory as reported in the journals, and by the letters of inquiry upon the same subject, there is much need of knowledge of the principles involved, the object in view, and application of these principles in daily practice. The space at our command limits this article to a mere digest of the subject.

We claim no more for the doctrines inculcated than science supports; we expect no concessions from opponents that science does not demand. The writer is responsible for the enunciation that failure in operations is mainly due to incompatibility of filling materials with tooth bone. We deem it best to consider but a single principle in this short article, namely: the cause of incompatibility of fillings, and will take for illustration, gold and gutta percha, which are the two extremes. We venture to say, the latter is most compatible with teeth bone under the following conditions: In cases of leaky fillings, and in teeth so frail as to admit moisture to the filling through the tooth bone.

The theory is based upon the universal law that contact, say of copper and zinc, in a battery gives passage to a galvanic current—increased chemical action at the expense or loss of the zinc. Every tooth filled with metal is a miniature battery subject to the same fundmental law. All the variations, from preservation to destruction of teeth by filling, are modifications or change of conditions. The results are the outcome of circumstances elected by the operator in the adaptation of filling material to tooth bone. Moisture is an element of secondary decay or decay around fillings. This is admitted by all opponents to the theory, yet it is said that "failure in operations is mainly due to defective manipulation." Why do defects produce decay? Simply because gold is incompatible with tooth bone in the presence of moisture. The perfect filling deprives the battery of the fluid element and checks the current as in any other battery. The fact that perfect fillings of this material preserve teeth is proof of our position. Imperfection likewise is proof of incompatibility.

Moisture is an element in all teeth, yet all teeth do not decay; neither do any decay from within. Decay around fillings is the result of moisture decomposed. Decomposition is a process of chemical action. Ordinary decay is a manifestation of such action. Galvanism, which is modified electricity, is always present with chemical action. The galvanic current is a powerful agent of decomposition. Now let us consult nature's text-book, the galvanic battery, for facts. We find that when two metals are plunged into a liquid which is a conductor of electricity, and of a nature to act upon one or both of the metals unequally, they will be found to be in different electrical condition—the one positive and the other negative. There is no current produced till contact is made between the two elements, then the current is established and continues as long as chemical action and contact remain.

There has been no little dispute upon the question as to which precedes the other—chemical action or the current. A little reflection would save time in this direction. Each is a part of a circle. The two elements, when separated, are in a state of static electricity Contact equalizes the potential and but for chemical action they would be equally electrified. But chemical action, which is induced by the current, maintains the inequality and thus the current continues. We now transfer the workings of this law to the oral cavity and we find it to obey as correctly as that of gravitation in its manifestations upon a poor fitting atmospheric plate.

Decomposed fluid we have already stated is the cause of incompatibility of filling material with tooth bone. Continued decomposition is maintained by circulation. If a filling of any material in general use is perfect at the margins and the tooth is of proper density, there is no chemical action, no current, no decay back of the filling. This action, however, is at *first* set up with amalgam, and usually with tin, in all teeth filled with these materials, but for lack of circulation—more moisture to be decomposed, the effects of the effort remain an insoluable compound, compatible with both filling material and dentine. Lest the remarks respecting amalgam may not be understood it should be known that amalgam contains at least two elements of a battery, the alloy and the mercury. The two are not chemically combined like the melting together of gold and silver. The presence of a fluid like oral secretions furnishes the third element of a battery, and sets up slight action with amalgam, as can be clearly demonstrated.

The dentinal walls of any tooth are sufficiently damp to corrode the surface of amalgam in contact therewith. Thus we look in vain for brightness in amalgam in contact with dentine. This has nothing to do with the durability of the filling or preservation of the teeth. One advantage which might be claimed for the tarnished lining is that it reduces conductivity of the filling, and in case of frail dentine, or in the teeth of children where calification is incomplete, the metalic compound is received iuto the animal or organic substance of the teeth, thereby raising it to the same potential as the filling which cuts off chemical action, just as would happen in the deposition of copper upon the zinc element of a battery. With gold there would be, under the same canditions, no tarnish to lessen conductivity—nothing to restore the tooth, which is the positive element, to the same potential with the gold. On the other hand, any admission of moisture between the gold and dentine is equivalent to decomposition of the fluid and the tooth, according to conditions to be mentioned hereafter.

With gutta percha, or any other non-conducting material, the moisture accessable to the filling and walls of the cavity remains unchanged so far as a current is concerned. There would be none of the increased sensitiveness common to like exposure with gold; the conditions remain the same as would be apparent in like exposures where there are no fillings. One of the hindrances to the reception of truth in relation to chemical laws consists in the unwarranted statement that the tendency of the electro-chemical theory is to degrade the profession, also to discourage the use of gold. We do not attempt to meet any such inconsiderate charges, but rely upon the principle that truth cannot injure a just cause. The writer advocates the use of gold to the extent of its usefulness.

We do not claim that a practice conducted upon a scientific basis would essentially differ from one based upon practical experience; truth is a unit no matter how obtained; and practical knowledge is gained only by years of observation—years of failure as well as success. I believe that the result of every operation is determined by positive law, the conditions of which are present at the commencement; that each law acts within its own prescribed sphere; that it is the dentist's privilege, with a knowledge of natural laws, to so select material and arrange the conditions that success may be among things possible. Without this knowledge the young operator is left to go on in the belief that "failure in operation is mainly due to defective manipulation," and perform operations perhaps in direct violation of law itself. We need more investigation for principles upon which to establish practice, and less effort to maintain practice regardless of principle.

In the hope to convince the reader that the laws which we have already set forth are as much in the interest of a gold practice as they are in the other extreme, we quote from the writings of Dr. Geo. Watt, of Ohio, who is well known to the profession as an earnest advocate of gold, and as strongly opposed to amalgam. His practical knowledge of chemistry enables him to comprehend the subject of oral electricity, while his truthfulness to science prompts him to record his views regardless of their application to this or that practice. In returning to the subject of decomposition of fluids under fillings, Dr. Watt says:

"Saliva has a strong affinity for oxygen, and absorbs it readily from the atmosphere; that it corrodes many of the metals; that it is an electrolyte; and that acidity is generally a result of its decomposition." Again, "When a gold plug leaks, there is apt to be galvanic action. The organic matter of the dentine is a conductor, and in this case represents the corroded or zinc side of the battery. Hydrochloric acid decay occurs in such cases, when the buccal fluids are normal, but when ammonia is present, we may have white decay co-operative with it, owing to the formation of nitric acid by electolysis of the ammonia."

There can be nothing plainer than this statement—it is only a transfer from the labratory to the oral cavity. It involves no new principle; it does not interfere with practice new or old, except as the operator may be governed by scientific diagnosis to adapt filling materials to the conditions which warrant success. We grant that long practice may furnish the same knowledge; but it is not professional nor progressive to insist that all knowledge shall be acquired by the experimental method and at the needless expense of the patient.

SYRACUSE, N. Y.

ATTRACTION IN DENTAL SOCIETY MEETINGS.

BY F. E. HOWARD, M. D. S.

I have always contended that we might make our society meetings much more attractive than at present to a class of men who seldom attend, but whom we would be glad to welcome as members—

or even as lookers on. There are few who would not join if interested enough to attend the meetings. These men once enlisted would do credit to the society and would be pleased and profited by their attendance.

One of the principal objects of the society meetings is to exchange ideas with one another ; the public get the benefit of this, and the usefulness and importance of dentistry is enhanced. Though insignificant as some may affirm, these meetings create with the public a demand for something better, and qualify the profession to a great extent to meet the demand. How then can we meet this demand ? The more numerous the attendance the better the result, and the greater the good. If we can devise means to attract more to these gatherings we will have accomplished much.

1st. I would suggest that the *clinic* be made an important feature ; it can certainly be made a very attractive one.

When the "call" for the meeting is issued, the different subjects for discussion are looked over ; if they do not strike the dentist as particularly interesting, he lets the matter drop and fails to attend.

2d. Let us now consider whether the meetings might not be made more attractive to those who do not generally attend ?

From observations that I have made, I am convinced that all dentists are not good operators—that they are not competent in all departments. Some will never be proficient. but there are many who would like to be, and would go a good ways to witness a *clinic.*

In dentistry there are a great many methods of accomplishing the same end. Now let us see if this feature can not be made an attractive one. I would suggest that at our next annual and semi-annual meetings we *establish* a *clinic* worthy the name. This would be interesting to a great many whom we might term outsiders, and perhaps be quite as profitable for ourselves.

There are a great many of the most skillful men in the profession who perform operations in entirely different ways, and yet attain the same end—success. There is such a difference of opinion as to how this and that operation should be performed, that it is certeinly interesting and instructive to see how A, B or C attains the same end by his (the best) method. One operator will use gold and fill with pellets entirely ; another will use cylinders suceessfully.

Bicuspids and molars are filled on approximate surfaces with V shape space left. Contour fillings are made by some on these surfaces. The front teeth are filled from the labial and palatine surface. There are a dozen methods of capping pulps and as many more for filling roots. Teeth are bleached by many different methods and according to the circumstances indicated. Think of the different methods of grafting artificial crowns and setting pivot teeth. Then there are hundreds of operators with different plastic fillings. That might be made interesting and instructive to all.

The treatment of abscess, necrosis, Riggs' disease, superficial decay, erosion, and calcarious defects involves many materials and methods. The administration of anasthetics, extracting, and the many interesting things in chemistry and microscopy might be demonstrated. And just think of the field of work in the mechanical department that might be made to fill in the time. There would be no end to the interest that might be excited in this direction. In my opinion, if a good programme were gotten up and each one do his part, glorious meetings might be had for the asking. From five to six hours should be devoted to this work alone, and all at one place; not three or four clinics at different offices, as I have known to be the case. Have the work concentrated. I believe our number can be doubled and a better and more profitable time insured. I would not for a moment have anything neglected in the other departments. The usual "valuable paper" must appear and discussion follow. These would be all the more interesting associated with the clinic, demonstrating from time to time the operation and methods advocated.

GENESEO, N. Y.

PREPARATION OF THE MOUTH FOR ARTIFICIAL DENTURES.

BY A. P. BURKHART, M. D. S.

No definite rule can be laid down for the preparation of the mouth—for the extraction of the teeth and removal of portions of the alveolar process. Upon this point the keenest and best judgment should be exercised. My rule is to save, if possible, all firm and good teeth, particularly in the lower jaw. If in preparing the upper jaw it is found necessary to remove incisiors, canines, bicuspids and molars, first extract incisors and bicuspids, then by passing the forceps into the alveoli of the lateral incisor and first bicuspid the canines can be easily removed. Having completed the extraction of necessary teeth and roots, remove all pieces of loose process between the previously occupied alveoli from the first molar of the right side to that of the left. Sometimes broken pieces of process adhere to the gum, which should be neatly dissected off. This may seem harsh treatment, but the rapid and neat healing of the gums will amply repay the patient and dentist for this extra annoyance. Moreover, this treatment cannot be detrimental, since the process would naturally absorb. By this method the gums will be in better shape in four weeks time to receive a plate, than would be the case in the majority of mouths at the expiration of six months, where the process had not been removed at the time of extracting the teeth. In a measure the same treatment described for an upper jaw will apply to a lower. After the extraction of teeth, roots and process, the healing of the gums may be aided by proper applications.

As to the proper time to wait for the insertion of a plate, no definite rule can be laid down. Usually from two to four weeks is a sufficient length of time to wait before putting in the first plate. The condition of the mouth and fit of the first plate must determine when the second, or permanent set as it is usually called, should be inserted.

DANSVILLE, N. Y.

DENTAL HISTOLOGY.

A paper of considerable interest to the student of Dental Histology, was published by Mm. Legros and Magitot in the *Journal de l'anatomie et de la physiol.* de M. Ch. Robin last year (1879). It is a continuation of a former communication upon the origin and formation of the dental follicle, of which a free paraphrase has been lately published by Dr. Dean of Chicago.

The authors describe the dental tissues and their development in some detail ; and their views, differing in many respects from those of any other observers, are of such importance as to call for a full notice here.

They enumerate as parts of the dental follicle—

1. The follicular wall.

2. *A special cement organ* (in the case only of those teeth furnished with thick coronal cement).

3. The enamel organ.

4. The dentine bulb or pulp.

It will be noticed that they stand alone in making mention of a specialised cement organ.

1. *The follicular wall* is described in some detail as a delicate translucid membrane (not laminated), consisting of embryonic elements, fusiform bodies, &c., imbedded in an amorphous substance, but becoming more tough and fibrous at later stages of development. It is richly vascular, its vessels being derived from the arteries entering the dental pulp, though anastomosis takes place at its summit (region of the "gubernaculum") with capillaries of the gum. Its vessels throw out abundant branches inwards, which form a regular plexus on the outside of the enamel organ.

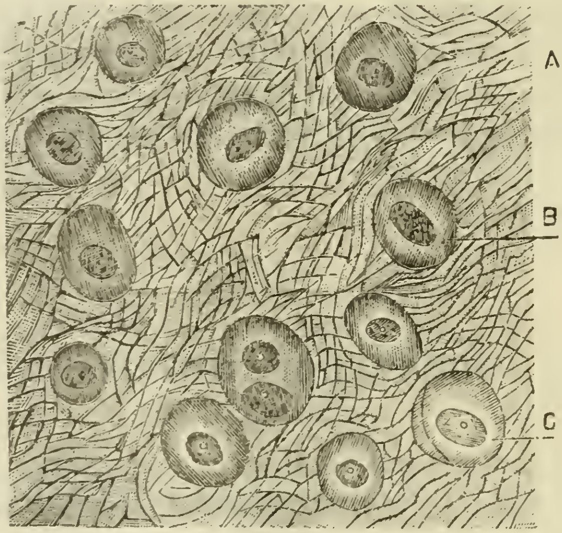


FIG. 1.

2. The cement organ. This is peculiar to those creatures which have coronal cement, such as the herbivora, and is absent in man and carnivora, in whom coronal cement is rudimentary. Beneath the

follicle wall and outside the enamel organ lies, at the stage of first formation of a rudiment of the crown of a calf's tooth, a soft greyish layer, extending down to the base of the dentine bulb, which it covers like a cap ; it is semi-transparent and milky looking, of firmer consistence than an enamel organ, richly vascular ; it is some tenths of a millimetre thick, so that it is visible to the naked eye.

As the coronal cement is not formed till after the enamel and dentine, the cement organ remains long in this stage, in which it is an embryonic organ built up of fusiform cells forming a kind of fibrous layer.

Later on it becomes cartilaginous ; fresh elements are recognisable in it, namely, the cavities containing one or more cartilaginous cells, chondroplasts. The cells contain spherical nuclei of sharply defined contour.

There would hence appear to be a sharply defined difference between the method of ossification of coronal and of radical cementum—the former being a calcification in a cartilage, the latter taking place like other membrane ossifications without any cartilaginous structures being formed,—the details of calcification are, however, reserved for a future communication.

3. The enamel organ is a cap which exactly fits the contour of the dentine pulp, but there is no adherence between the two. It is absolutely without vessels and without nerves.

It is at first, all epithelial ; its central portion becomes transformed into stellate reticulum, and its general consistence becomes gelatinous ; and next this central portion disappears, and its outer and inner parts come together—this happens as soon as enamel begins to be formed. The outer layer (external epithelium) of the enamel organ is brought into intimate relation with the vessels of the follicle wall by prolongations into it. After minutely describing the enamel cells (internal epithelium) without in other respects establishing any difference of structure from that laid down by other authors, they go on to describe the enamel-forming, working end of each cell as being sharply terminated by a dense plate. They believe that there is a process of exosmosis going on through these plates, and that the constituents of the enamel have to traverse them to get to the dentine on which they are to be deposited. They point out that these plates are not destroyed by reagents which destroy the rest of the cells, and that they often cohere by their sides into a sheet, thus forming the so-called membrana preformativa. English readers will recognize these plates ("plateaux") as old acquaintances, though they will probably interpret their functions quite differently.

4. The dentine pulp or bulb is at first composed of embryonic elements in a basis substance which is amorphous, but very tough; it is easily made granular by reagents or even by water. There is a hyaline border to a fresh pulp due to the amorphous basis substance projecting, so to speak, beyond the cell elements, and this may be so torn and folded as to present the fallacious appearance of being a membrane; no membrane, however, exists in this situation.

Odontoblasts are said to originate in this layer, and to develop a filament at each extremity; or rather several at their deeper ends, and one towards the dentine that is to be. They have no special walls, but are homogenous masses, and their prolongations are of the same composition as the cells; they alter rapidly after death, and are much affected by all reagents. Beneath comes a layer of star-shaped branched cells anastomosing freely with the free ends of the odontoblasts. As to the distribution of the nerves of the pulp, the authors advance a view of much novelty. They describe the nerves as entering the tooth in two or three bundles, &c.. and *finally becoming continuous with the star-shaped cells subjacent to the odontoblasts.* This stratum of cells they regard as nerve cells, an expansion of the nerves entering the pulp, and serving as intermediate elements between the nerves proper and the odontoblasts.

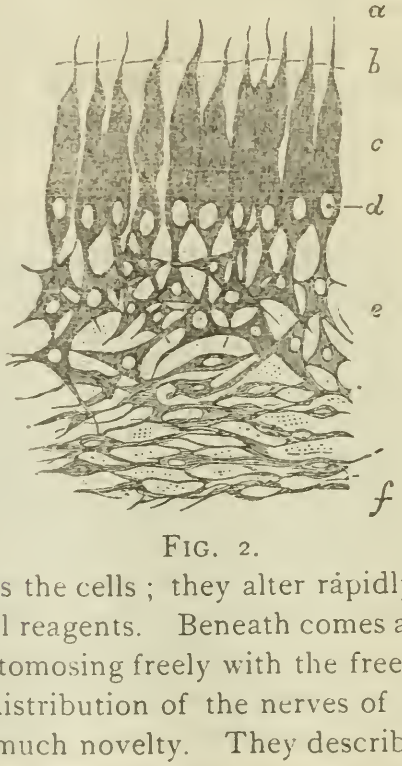


FIG. 2.

These results they have obtained by the study of pulps prepared in osmic acid and stained with chlorid of gold, and they express themselves as unable to confirm Boll's observations on the termination of the nerves of the pulp, which have hitherto passed unchallenged.

Our authors would therefore explain the sensibility of dentine as actually due to the processes of the odontoblasts, which are themselves connected by the medium of the star-shaped cells with the nerves.

They further note the occurrence of amorphous calcospherites in the pulp during early stages of calcification, and of occasional deposits of Hœmatoidin.

To sum up, the chief new points advocated in these pages, which well merit being read in extenso, are :—(i.) The existence of a specialised cement organ for the manufacture of coronal cement. (ii.) The existence of dense plates upon the working ends of the enamel cells, necessitating the adoption of a transudation theory of enamel formation. (iii.) The direct connection of the nerves of the pulp, with the stratum intermedium of the dentine pulp, and through this with the odontoblasts.—C. S. T., in *Monthly Review of Dental Surgery.*

CONDUCTORIAL.

ANOTHER BUGABOO.

Now that it is settled with the best informed in the profession that calomel and corrosive sublimate are not manufactured in the mouth by the inter-action of (hypothetical ?) hydrochloric acid or chlorid of sodium and amalgam fillings, there must needs be invented some other cause of dental troubles originating in or near filled teeth.

The latest bugaboo is tin foil. This certainly is an innocent material of itself, and the last against which any serious thing should be said, particularly if the proof is not at hand. But tin foil as we find it at the dental depots is somewhat cohesive, and according to some this cohesiveness must be due to the presence of some impurity—some alloy. An odd conclusion to be sure, especially when it is not uncommon belief that cohesiveness belongs to simple metals rather than to any of their mechanical compounds. But this conclusion may be justified on the principle that "across lots" is often the shortest way home.

Now lead is frequently associated with tin naturally and in the arts. More than that, lead is cohesive. To what else then can the cohesiveness of tin foil be due if not to the lead it contains—or is supposed to contain? Then lead, or some chemical modification of it, acts under certain circumstances as a poisonous substance. Mummy jaws may have been loaded with chunks as large as a school boy's "sinker," and handed down to us ripe, if not redolent with age; minnie balls may lie embedded in patriotic legs for years; paint makers work at their trade for a lifetime; paint users wink at colic all their days, and no harm results; but let never so small an amount find its way into a batch of tin foil and it is all up with those who have been made victims of tin foil fillings—their neuralgias, their aches, their pains, without name and without number, are traced in a twinkling to conjectural lead.

At the request of a patron for whom we had filled several teeth with tin foil we removed the fillings and substituted amalgam. We did this under protest of course, at the same time conveying the information that what was wanted and what we were about to put in contained not only tin, but mercury; that *possibly* we were about to substitute a brace of objectional materials for one; that the tin in the amalgam might contain lead, and that it necessarily contained mercury. This talk, however, was of no avail, so the fillings were removed and amalgam introduced in its stead. The effect was salutary—peace of mind began to manifest itself, and so far as we know has continued to date.

As a matter of personal satisfaction we submitted the fillings to an accomplished chemist and a few days later received the following:

DEAR DR.:

No Lead.

Yours,

———

We are perfectly satisfied that tin foil for dental purposes contains no lead. We know it contained none in this case, "for he himself (we mean the chemist), hath said it."

WHY THEY DO IT.

We have often heard it asked by dentists why it is that our lady patrons insist upon seating themselves in the operating chair from the right side—the side on which all right-handed operators stand when at work. We have just been informed.

A lady called to have some trivial operation performed, and when requested to take the chair from the left side politely declined —in other words "she thought not." This request was made because the way to the chair from the right side was blockaded by an operating stool, a dental engine, an ottoman and ourself. It was "much more natural, you know" to step in from the right. When asked for a more definite reason she said ladies as a rule trim their wearing apparel on the right side, and as such apparel is trimmed for show and sitting on it for fifteen minutes to three or four hours is not conducive to improvement in its appearance, they prefer to take not only a dental chair, but other chairs from the right. In this way there is no "mussing" of the dress, and the trimming shows to the best advantage. Inconvenient to the dentist and annoying though it be, he must submit. This momentuous question may now be regarded as settled.

THOSE DISKS.

Complaint has been made that celluloid disks warp when permitted to lie idle. This rarely occurs while the disks are on mandrils, but when it does a few turns between the thumb and finger will straighten them up again. Disks not on mandrils may be made true by breathing on them a few moments or by dipping in warm water and placing them under pressure. It is a good plan to keep them under pressure at all times. As intimated in our April number, we believe them to be the best cheap disks made.

NECROLOGICAL.

THOMAS BELL, F. R. S., F. R. C. S., ETC.

Died at Selborne, England, March 13th, 1880, Thomas Bell, in the 88th year of his age.

In the course of a long and appreciative death notice, the *Monthly Review of Dental Surgery* has the following: "Of one possessed of such a roll of honors, our specialty may indeed feel proud, and although it is hardly to be expected we can boast one such in each ensuing century, we trust so high an example may not be without imitation."

NO "BATTERY" IN A TOOTH.

1. Experiments with plugged cubes are absolutely incomparable with each other, if not verified and compared with the results obtained with an unfilled cube of the very same tooth.

2. Different teeth and cubes made thereof lose very differently in the same acid, in the same time, without any visible difference in their structure; e. g. 6 teeth lost in 500 ccm of acetic acid (vinegar,) of 2.1 p. c. strength respectively 13.5, 17.5, 25.4, 12.8, 18.9, 14.4 p. c., the loss included almost no organic substance, but only the inorganic salts, so that a tooth or cube of a tooth never can be used twice.

3. That the drying before and after immersion has to be done very carefully in a water bath, the balance should give five milligrams, ($\frac{1}{50}$ grains.)

As I think that a full report of my experiments is not of sufficient interest to all of my readers, I only give the results; the exact report of the experiments is to every one's disposition if required.

I accompanied every root plugged by a reliable dentist of this city respectively with gold, amalgam, gutta-percha, oxychloride, with another root of the same tooth, so as to see plainly what the filled root would have lost if not filled; both roots were of nearly the same weight. I brought both roots to equal surfaces exposed to the acid by filling the cavity of the test root with some wax which by previous experiments I had found to be absolutely without influence on the solubility of the tooth; all the four plugged roots together with the four test roots were put into the same vessel, covered with 500 ccm acid of the above strength and left entirely undisturbed for one week; the average weight of an unplugged root was about 300 milligrams and the average absolute loss about 18 p. c. Supposing Dr. Chase's cubes of about 300 milligrams, (the absolute figure matters little here, since the relative loss in comparison with a wax-filled root is the chief point,) his cubes lost :

Gold filled cube,	20 p. c.
Amalgam "	13 p. c.
Gutta-percha "	3 p. c.
Wax filled "	3 p. c.
Oxychloride "	– p. c.

Taking the wax-filled cube as the point of comparison, we find the following excesses of loss of above the otherwise filled cubes, as obtained by Dr. Chase compared with my experiments :

Dr. Chase's experiments :		My experiments :
Gold filled cube	+ 17 p. c.	– 0-9 p. c.
Amalgam "	+ 10 p. c.	+ 1.9 p. c.
Gutta-percha "	– p. c.	+ 1.3 p. c.
Oxychloride "	– p. c.	– 1.9 p. c.

—MAYN, in *Independent Practitioner.*

FILINGS.

Prof. J. Taft and Drs. R. B. Winder and R. Finley Hunt have issued a call for a Mass Convention of the Dentists of the United States to organize a National Dental Association. At their annual meetings in 1879 the Southern Dental Association and the American Dental Convention each appointed a committee invested with full power to adopt measures for the formation of a National Dental Association. The American Dental Association at its meeting in the same year appointed a committee to confer with these two committees on this movement and report to the Association at its meeting in Boston, August 3d, 1880. At a meeting of chairmen held in New York, May 11, 1880, it was decided to fix the time and place of meeting for Wednesday, August 11, 1880, at 11 o'clock A. M., in the City of New York. A Constitution and all necessary regulations will be prepared by a sub-committee, and submitted for revision to a meeting of the full committees, to be held in the same city on Monday, August 9, 1880. The importance of this measure requires that the whole time of the Convention shall be devoted to the business of organization. All members of State societies and associations are cordially invited to be present and take part in its proceedings. It is hoped that *every* Dentist in the country who can *possibly* go to New York at that time will be present. Drs. O. E. Hill of Brooklyn, and L. S. Straw of Newburgh, represent New York State Society on the Executive Committee.

Officers are hereby informed that it will give us pleasure to notice the doings of the several district societies of this State, provided the facts are furnished in concise form.

The following gentlemen have been elected to office in the 6th district society, headquarters at Binghampton :

President—L. E. Ireland, Oneonta.

Vice President — G. W. Hoysradt, Ithaca.

Recording Secretary—A. J. Wright, Owego.

Corresponding Secretary—C. W. Cox, Horseheads.

Treasurer—F. B. Darby, Elmira.

Delegates to the State Society for four years—E. D. Downs, H. Hodge.

Delegate to the American Dental Association—L. E. Ireland.

Censor—F. B. Darby.

E. D. Downs of Owego, passed the examination and was elected to membership.

In the 7th district the election resulted as follows :

President—F. French, Rochester.

Vice-President—W. E. Royce, Brockport.

Recording Secretary—A. P. Burkhart, Dansville.

Corresponding Secretary—F. E. Howard, Geneseo.

Treasurer—J. Requa, Rochester.

Librarian—H. S. Miller, Rochester.

District Censor—J. Edw. Line, Rochester.

Delegates to State Society—J. S. Walter and A. P. Burkhart.

H. C. Knickerbocker of Seneca Falls, passed a very creditable examination, and was made a member. He received the society's certificate of qualification.

Rumor has it that Dr. Tripp, Jr., of Auburn, has succeeded in making a good substitute for corrundum points and disks. The only objection that manufacturers and dealers can urge against them is that they wear out only after long use. We hope to see them in market soon.

Dental Meetings—The several district societies of this State held their annual meetings in April, and from the published reports of some we judge that interesting times were had. The State Society met at Albany the 12th of May. Papers were read and discussed, reports from the district societies acted on, candidates for the degree of M. D. S. examined and the degree conferred on four of them. Their names are as follows : E. D. Fuller, M. D., Peekskill ; L. G. Wilder, Brooklyn ; Hyman Rosa, Kingston ; L. S. Straw, Newberg. On account of legislative and political matter the local papers were compelled to limit their notices of the meeting to a few lines.

Celluloid Suit.—For Judge Blatchford's decision in the suit of Spill *vs.* The Celluloid Manufacturing Co., the reader is referred to the issue of June 26, 1880, of the *Scientific American.* The greater part of it would appear in the present number of this journal but for the fact that the paper above mentioned arrived too late—after all matter had been set up and part of it gone to press.

Local Use of Chloroform in Dentistry.—Dr. Schaffer, speaking from an extensive experience in tooth-extraction, states that the local use of chloroform forms a most admirable preventive of subsequent hemorrhage or other ill consequences, and hastens the contraction of the wound in the gums. He strongly recommends it as a "mouth-wash," acting as it does in all affections of the gums and teeth as a disinfectant, anodyne, and corroborant. The formula he uses is : spirits of wine one hundred, and chloroform five to ten parts, peppermint oil five to ten drops.—*Wien. Med. Woch.,--Med. Times & Gaz.*

WE MANUFACTURE AND KEEP FOR SALE

—WHOLESALE AND RETAIL—

ALL GOODS USED BY DENTISTS,

—OUR SPECIATIES ARE—

Office and Turning Lathes,
Adjustable Dental Brackets,
Articulators, Flasks, Lamps, &c.,
Iron Base Dental Chairs,
Dental Registers,
Appointment Books,
Sterling Amalgam,
Caulk's Diamond Cement,
Plastic Flint Stopping,
Sterling Gold Foil,
Tooth Powder,
Tooth Powder Jars,
Sterling Rubber.

THE LARGEST VARIETY & BEST STOCK OF TEETH.

Discounts made to those buying an Outfit.

SEND FOR PRICE LIST.

DAVIS & LEYDEN,

91 & 93 State St, Rochester, N. Y.

STERLING AMALGAM

The Sterling Amalgam now stands pre-eminent, as the best filling for teeth there is made (gold excepted). It is used by the best Dentists in every State in the Union, and their letters of endorsement and recommendation are received daily. It has been a surprise to many to find a first-class Amalgam which would always keep bright in the mouth and never wear out, that could be made for so low a price: yet they all agree that the **Sterling has no equal**, even among the high-priced fillings, which are so extensively advertised. There has always been quite a proportion of the Dental profession who have measured the value of Amalgam by the price that has been asked for it, but very many of these are now learning by experience that we are able to produce and furnish first-class Fillings, at prices in proportion to their value, in these stringent times.

We warrant the Sterling Amalgam to contain Gold, Silver and Platinum, and challenge comparison with any Amalgam made in this country or any other, as to its being more plastic, working easier, keeping brighter, does not shrink; looking and wearing the brightest in the mouth; wears the longest, is the toughest, and gives the best satisfaction to the patient of any ever made.

We guarantee every Package to give entire Satisfaction, and will Refund the money in every case where it does not prove as represented.

Price No. 1, Per Ounce	$3.00
Price 2-3 " "	2.00
Price 1-3 " "	1.00

The above is the same in every respect that we have sold for the last seven years.

STERLING No. 2.

We have a few customers who desire a very hard flint-like filling, which in an Amalgam has never been produced without an excess of silver, which always corrodes and oxydizes, our experiments have proved that by a judicious use of Platinum this can be overcome, but at an additional expense. This Amalgam is no better than No. 1, but in this respect.

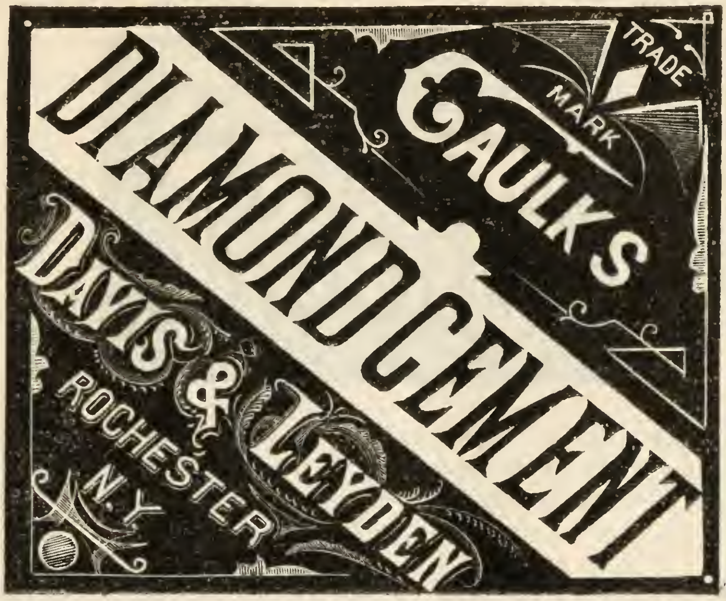
Price No. 2. Per Ounce,	$4.00
" " " " one-half ounce	2.00
" " " " one-fourth ounce	1.00

Sent by mail, post-paid, when cash accompanies order.

DAVIS & LEYDEN, Rochester, N. Y.

THE IDEAL FILLING!

FOUND AT LAST!



FOUND AT LAST!

Destined to Supercede all other Filling for Teeth.

It is not an Oxychloride or a Phosphate Cement, but is a step in advance, of the nature and character of the tooth itself ; even superior to gold as a non-conductor and non-irritant, and saving long hours of tedious work to the Operator, and giving happiness to the patient.

This Filling is so hard and retains its integrity so perfectly against the acids of the mouth, that after being in the tooth for years, the margins of the Filling are perfect and scarcely perceptible. It adheres closely to the walls of the cavity, makes the best obtunder and nerve capping. For pivoting Teeth and Lining of Teeth with frail walls, it is just the thing.

Price per Package, large	two shades,	$2.00
" " " ordinary,	one shade,	1.00

Tubes, for Color, 25 cents.

Sent by mail on receipt of the price.

DAVIS & LEYDEN,
Sole Agents, Rochester, N. Y.

Kept at all Dental Depots.

PLASTIC FLINT STOPPING.

This Filling has peculiar advantages, which is bringing it into General use, and giving Universal Satisfaction, for Lining the Walls of Cavities, Filling Roots, Nerve Capping and Sensative Dentine, it has no equal.

Is a perfect non-conductor; adheres closely to the walls of the cavity; works as plastic and soft as wax; will not shrink or expand in the least; hardens quickly and very hard; can be finished with a file and burnisher; is not in the least affected by the acids of the mouth; not only valuable for temporary filling, but will last in many cases for years.

No large filling of Gold or Amalgam should ever be put in a tooth without first lining the walls of the cavity with this filling. One of our most skillful operators says: "After practicing for nearly forty years, I have never been able to make my patients so comfortable and happy as since I commenced the use of this filling." He uses it as the foundation for all large cavities, capping it with Gold or Cement for the grinding surface.

The use of this Filling in Lining Cavities, removes all the objection that can be offered to Amalgam and Cement Fillings.

Price, per ounce .... $5.00.

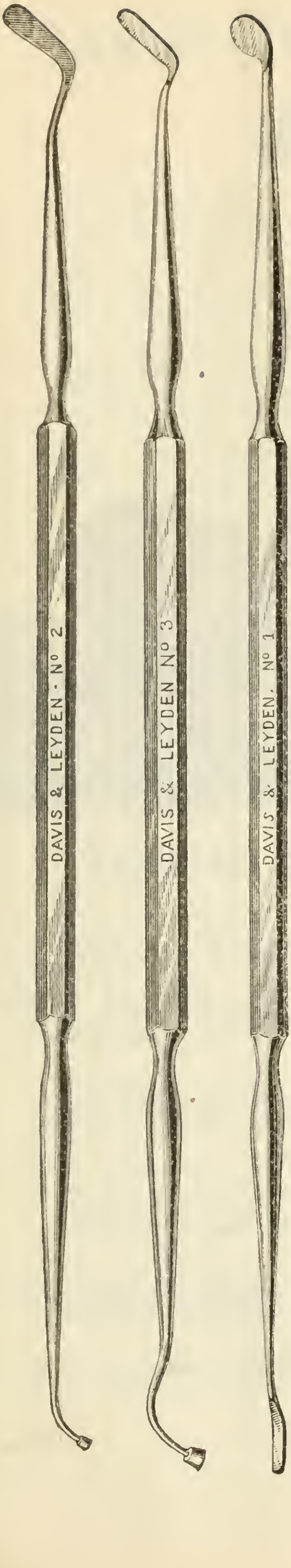
Put up 1-2, 1-4, 1-5 and 1-10 oz. Packages.

Sent by Mail Post-paid on Receipt of the Cash.

In every case, if this does not prove to work the softest and most plastic, and become the hardest and most resistant of any of the G. P. Fillings, we will gladly refund the money.

DAVIS & LEYDEN,
Rochester, N. Y.

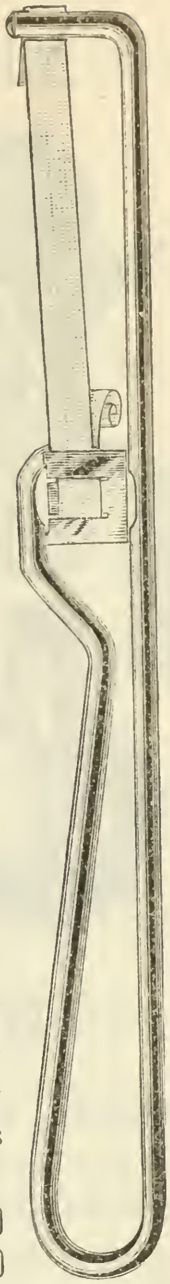
Kept at all Dental Depots.



DOUBLE END
PLASTIC
Filling
Instruments.

These Instruments for Amalgam Cement, or Stopping, filling and Burnishing, are of the most approved patterns, of the best steel polished and nickle plated.

Price per Set of three Instruments, $2.50



TAPE HOLDER.

This carrier is so simple that the tape can be changed instantly, and is held perfectly firm and tight, can get in any part of the mouth and takes comparatively no room.

Price per pair Right and Left, - $1.00
" for Single one, for front Teeth, .60

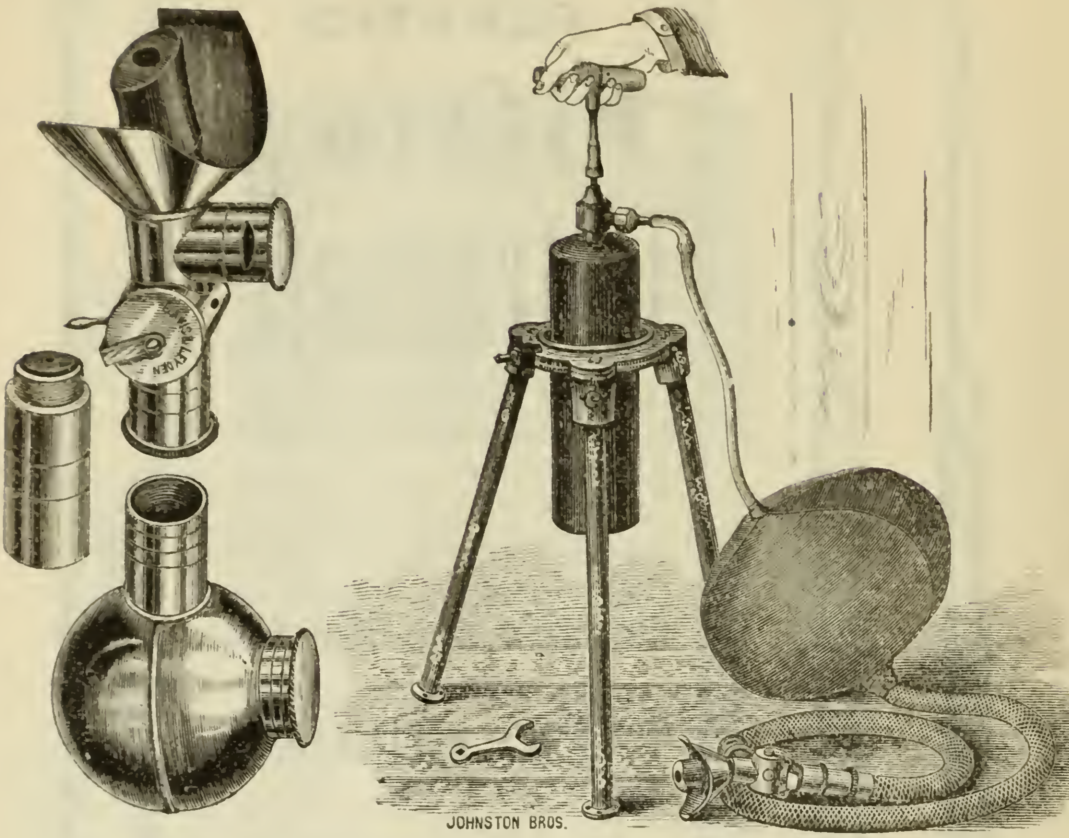
DIAMOND POLISHERS
FOR FINISHING FILLINGS.

These are fine Grain Tape Strips with Crocus, Oxide of Iron, Crocus and Flour Emory, gives the best of satisfaction.

Put up in Assorted Sizes—Price per Box, - 50 cts.

DAVIS & LEYDEN,
Rochester, N. Y.

NITROUS OXIDE GAS.



NITROUS OXIDE GAS OUTFIT,

Including Iron Cylinder, filled with one hundred gallons of gas; Tripod beautifully ornamented; Rubber bag, with wove net covered tubing, all attached ready for use; the latest and best double-spring Valve Inhaler, as shown,

All complete, for	$33 50
Inhaler, double-spring Valve, as shown separately	9 50
Inhaler complete, with Ether attachment, as shown	13 00
Cylinders refilled with 100 gals. gas, and returned by first express	6 00

The above is pronounced the best and most complete office outfit for Gas, that is made.

DAVIS & LEYDEN, Rochester, N. Y.

Labratory Supplies,

OUR OWN MANUFACTURE.

STUDENTS' AMATEUR LATHES.

NO. 1.	Two foot bed ; all iron ; with Chucks, Wrench, Dog, &c., complete	$10 00
NO. 2.	Two foot bed ; double head, with Chucks, Wrench, Dog, &c., complete	$14 00
NO. 3.	Three foot bed; double head, and made for heavy turning, polishing and grinding	$18 00

OFFICE POLISHING & GRINDING LATHES.

NO. 1.	Upright iron standard. Walnut adjustable top, with drawers, Split Chuck, &c.,	$16 00
NO. 2.	Dental Engine Lathe, all Nickle, beautiful design	$20 00

FOOT POWER FOR LATHES.

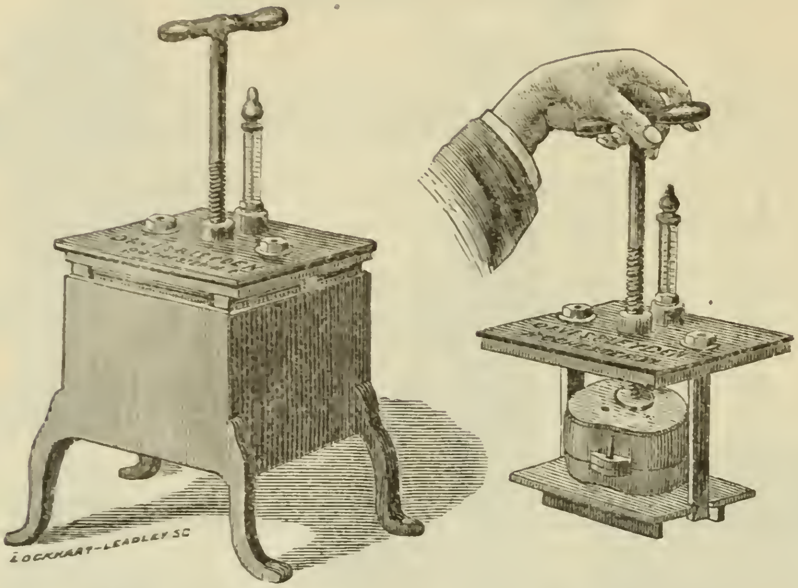
NO. 1.	Wheel twenty-eight pounds, nineteen inches diameter, all complete	$ 6 00
No. 2.	Wheel sixty pounds, twenty-seven inches diameter	$ 9 00

Slide Rests for Turning Lathes, Chucks and Attachments of all Kinds.

Lathe Head, with Universal Split Chuck, from	$4.50 to $8.00
The Rochester Kerosene Stove, price	2.50
The D. & L. Rubber Flask, tinned	1.00
" " " " clamp	1.50
Large Alcohol Lamp, for soldering	1.00
Benson's Gas Burner	1 00

DAVIS & LEYDEN,
Rochester, N. Y.

ROCHESTER CELLULOID APPARATUS.



FOR STEAM OR DRY HEAT.

We claim for this apparatus, these advantages over other machines. *Its simplicity and convenience. Its great strength and durability.* There are but three pieces to the whole machine—*i. e.* the outside case to be screwed to the table ; the inside cast iron boiler, and the wrought iron clamp. It can be used with equal success for either dry heat or steam, as the joints are packed with heavy rubber packing, allowing a pressure of 320°. The only screw used in the machine is the 7-8 inch, Swedes wrought iron screw running through the iron top 1 1-2 inch thick, which insures great strength and lasting qualities. The Flask can be taken out and examined as often as desired without interfering in the least with the work. The Flask does not rest on the bottom of the Boiler, and consequently must heat up evenly. The Flasks are the largest and heaviest made, which will do away with the annoyance of continual breakage. The Alcohol Lamp and Gas Burner used with this apparatus are of the latest and most improved pattern.

Price of	Apparatus, - - - - - - - - -		$9 00
"	Flasks, - - - - - - - -	extra,	1 00
"	Alcohol Lamp or Gas Burner, - - - -	"	1 00
"	Apparatus fitted to our Kerosene Stove, - - -		11 00

P. S.—Send for a list of References if you have any hesitancy in regard to its value.

DAVIS & LEYDEN, Rochester, N. Y.

JOHN BIDDLE,

—MANUFACTURER OF—

DENTAL INSTRUMENTS,

OF EVERY DESCRIPTION,

WHOLESALE AND RETAIL,

207 CENTER STREET, between Howard and Grand, - NEW YORK.

Orders Filled for all kinds Dental Goods.

Instruments Repaired in the Best Manner and at the Shortest Notice.

For Sale by DAVIS & LEYDEN, Rochester, N. Y.

APPOINTMENT BOOK.

This Appointment Book is 3½ by 7½ inches, with Flexible Morocco cover; gives the day of the week and hours of the day, the month, and day of the month to be written at the top. The cut of teeth and ruling allow a record of examination and prices given.

PRICE, - - - - - - - -	$1.00

DENTAL REGISTERS.

Our Registers are full letter size; page 8½ by 10½ inches; five full plates on each page. It is the most compact and convenient Reference and Record Book made.

Price, Bound in Cloth, Leather Back and Tips,	100 pages...........	$1 75
" " " " " " " "	200 pages...........	2 50
" " " " " " " "	300 pages...........	3 25
" " " " " half Leather,	400 pages...........	5 .00
Examination Record, 100 pages, on thin paper,....................		50

BILL HEADS.

Medium Size, 4½x7½ inches..................................	Price 40 cts.
Large Size, 7½x10 inches..................................	Price 70 cts.

Any of the above sent by mail, post-paid, on receipt of the price.

NÄBOLÏ:

FOR OBTUNDING SENSITIVE DENTINE!

For Preventing Pain in Filling Teeth!!

Patents allowed in the United States and Canada; also in progress for England, France, Belgium, Germany, Austria, Spain, and all of the Principal Countries of the Globe.

Among its numerous advantages, especial attention is called to the following:

First. It produces entire insensibility to pain during the process of excavating teeth for filling, a thing never before accomplished without danger.

Second. Its action is confined entirely to the tooth being operated upon—it does not benumb or render insensible any other organ.

Third. It contains no arsenic, phosphorus, zinc, or other poisonous or deleterious substance whatsoever.

Fourth. It is in no way injurious to the health of the patient, or to the vitality or structure of the teeth, and does not change their color in the least degree.

Fifth. It is perfectly harmless in every respect, and no accident can ever occur from its use.

Sixth. It enables the operator to do his work in much less time, and in a better manner than where it is not used.

Seventh. The mental torture and unnatural strain upon the nervous system of the patient, produced by a constant expectation and dread of sudden pain, are entirely avoided.

Eighth. The use of *Naboli* will save vast numbers of teeth which, on account of their extreme sensitiveness, would otherwise have to be extracted—thus greatly increasing the practice in this department of dentistry.

Ninth. It advertises itself, as every patient on whom it is used is sure to become an ardent advocate of its truly wonderful merits.

MANUFACTURED ONLY BY

The Dennett Dental Näbolï Company,

SOLE PROPRIETORS,

OFFICE, 96 TREMONT STREET, BOSTON, MASS., U. S. A.

N. B. To be obtained at all of the Dental Depots, where applications for license may be obtained.

STERLING RUBBER—This Rubber gives universal satisfaction. It takes a high finish, and we think is purer and has less foreign substance than any of the Dental Gums now manufactured.

Price, - - - - - - $3 75

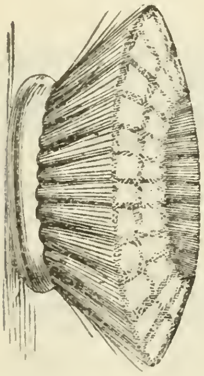
DAVIS & LEYDEN,
Rochester, N. Y.

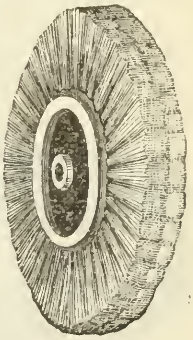
SYRACUSE
DENTAL DEPOT,
21 South Salina Street,
SYRACUSE, - - - - N. Y.

A Complete Stock of all goods used by Dentists kept on hand constantly.

ORDERS FILLED PROMPTLY.

H. C. LEYDEN & CO.





ESTABLISHED 1839.

CHAS. D. THUM,
150 N. 3d St.,
PHILADELPHIA,

—MANUFACTURER OF—

WHEEL BRUSHES,
(STEEL, BRASS, BRISTLE, COTTON, WOOL, &c.,)
FOR DENTISTS, JEWELERS, WATCHMAKERS, NICKLE PLATERS, SILVERSMITHS, &c.

——ALSO MANUFACTURER OF——

BRUSHES OF EVERY DESCRIPTION.

ESTABLISHED 1860.
"PROMPTNESS," "EXACTNESS" AND "FURNISHING THE BEST ARTICLE FOR THE PRICE," CONSTITUTE OUR SPECIALTY.

UNION TOOTH COMP'NY,

TRADE MARK

OFFICE AND FACTORY,
OXFORD, - - - - - N. Y.

—Manufacturers of all kinds of—

GUM AND PLAIN TEETH

In general use, also a variety of styles for SPECIAL CASES, which are not surpassed (if equaled), by any in this or any other country.

A Sample Set will be sent on receipt of One Dollar. A liberal discount for quantities of ten, twenty-five, fifty and one hundred, or more. Remit by Postal Order, Draft or Registered Letter.

There are so many preparations which obtain celebrity from being extensively advertised that it becomes necessary when anything of merit is introduced, that special attention should be called to it. The most delightful and efficient article for the teeth is

PHENOL DENTIFRICE.

Nothing to be compared with this popular compound has hitherto been produced.

Originated, prepared and sold to all dealers in Dental Materials, by

S. L. GEER, Dentist, Norwich, Conn.

Sold by DAVIS & LEYDEN, Rochester, N. Y.

EXCELSIOR TOOTH COMPANY

—MANUFACTURERS OF—

Superior Artificial Teeth,

—DEALERS IN ALL KINDS OF—

DENTAL GOODS.

Sample Sets sent to Dentists on the receipt of $1.00.

Special Inducements offered to the Trade

BIRDSALL & WAITE,

Whitney's Point, Broome Co., N. Y.

For Sale by DAVIS & LEYDEN, Rochester, N. Y.

LUKENS & CO.,

LATE BLAKE & CO.,

MANUFACTURERS OF

DENTAL INSTRUMENTS,

Of every Description,

WHOLESALE AND RETAIL.

248 N. EIGHTH ST., PHILADELPHIA.

Instruments of any Description

MADE TO ORDER.

ORDERS EXECUTED FROM ANY CATALOGUE PUBLISHED.

☞ Communications by Mail Promptly Attended to.

AKRON

DENTAL RUBBER

—ADDRESS—

AKRON RUBBER WORKS

AKRON, OHIO,

FOR SAMPLE AND PRICES.

THIS RUBBER IS A NEW COMPOUND OF FINEST QUALITY.

DENTISTS WILL FIND IT FOR THEIR INTEREST TO INVESTIGATE.

☞ PLEASE SAY WHERE YOU SAW THIS.

THE
Odontographic Journal.

VOL. I.——*October*, 1880.——NO. 3.

THE AMŒBA.

BY ANNA H. SEARING, M. D.

Read before the Rochester Microscopical Society.

In the year 1755, are the first recorded observations upon the *Amœba.* They were made by Rösel, in Germany, and he called it the "little *Proteus.*" In 1838, Ehrenberg, in his great work on Infusoria, described what he considered two species—*A. Diffluens* and *A. Princeps.* Unlike some of the other low forms of life which this same noted observer placed in the animal kingdom, but which have since been transferred to the vegetable kingdom by our best naturalists, such as *Diatoms* and *Volvox Globator*, the *Amœba* has retained its place with the *Protozoa*, and has until quite recent times been considered the most elementary form of animal organisms. The *Amœba* belongs to the *Rhizopods* and hence is nearly allied to the *Foraminifera* and *Radiolaria*, beautiful fossil forms of which have been exhibited to this society.

Unlike *those* shelled forms or those with silicious cases, the *Amœba* is without a case *or even a proper enclosing wall* when in its active state. The substance of this mobile, jelly-like, moving body has been called *Protoplasm* or, as Beale would call it, *Bioplasm* or pure germinal or living matter, and which chemically is an albuminoid. Its forms are so truly protean in the same individual that we are not surprised that it was called by its discoverer the "little *Proteus*" nor that it has since been somewhat popularly known as the "protean animalcule," as in a similar manner the *Vorticella* has been called the "bell-animalcule" and the *Stentor* the "trumpet-animalcule."

The specimens which I have had the opportunity for observing were most of them very small, somewhat like little scales, almost transparent, only slightly granular, and at times (excepting one is closely watched), without apparent change in form. After a few minutes and sometimes quickly it changes its form, stretching out a finger-like point or process from its substance here and a broader lobed prominence there, then drawing another up into itself, and in this manner or by means as it seems of these projections of its substance or protoplasm—the so-called pseudopodia or false feet—slowly crawling about on the glass slide.

I have lately observed some elongated or slug-like individuals with a distinct posterior tail-like extremity whose movements were quite rapid, creating some disturbance in the debris among which they were moving, and even dragging some portions of foreign matter after them which seemed adherent to the pointed extremity. As I had obtained these from some mossy earth between the bricks of a pavement, and as they were unlike any I had seen, it seemed possible that I had mistaken my individual for some low form of worm when suddenly it stretched out a head pseudopod and assumed the familiar outline.

The *Amœba* have in common with the true *Infusoria* a contracting or pulsating vesicle. A clear spot appears in some portion of its substance usually posterior to the centre and grows larger and larger, although quite slowly, and then suddenly contracts. These movements occurring with a certain degree of rhythm suggest the functional phenomena of a heart. Prof. Leidy thinks it is in a measure subservient to both respiratory and digestive functions.

Besides the contractile vesicle we find in them a so-called nucleus or kernel, being a portion of apparently firmer consistence than the protoplasm. The contractile vesicle and nucleus may both be obscured by the presence of substances which have been taken in as food, or by minute crystals which have the appearance of black particles.

For the purpose of more exact study naturalists discriminate two portions in its protoplasm: an endosarc and an ectosarc, or an interior and an exterior portion. The food and other substances are seen in the endosarc and the pseudopods are projected from the ectosarc or transparent portion, but the endosarc soon flows in. This circulation is shown plainly in the larger specimens of *Amœba Proteus.*

The *Amœba* can take food at any position of its surface. We have reason to suppose that it may imbibe nutritious fluids, but it evidently manifests a decided preference for organized matter. Diatoms, desmids and other *Algæ*, plant spores, zoospores and infusoria are all seen in its transparent protoplasm. Prof. Leidy thinks that its surface is not viscous, causing the food to adhere as is the case with certain plants. The pseudopods certainly are thrown about the particle and after something of an apparent effort it is finally enclosed and absorbed, or rather such portions as are digestible or assimilable; while the harder, silicious and indigestible parts are rejected. I saw one of the larger individuals whose endosarc was quite filled with diatoms reject a large one from its surface with sufficient force to send it quite a little distance from itself. The chlorophyll in the algæ seems chemically changed in this process of digestion, the green color becoming a yellowish brown. The currents which the food takes are often spoken of by observers, but they are not manifested always. As before alluded to in the *Amœba Proteus*, they are sufficiently perceptible, showing a constant change taking place in the mobile protoplasm.

When a pseudopod is projected from the ectosarc a current quickly flows in from the endosarc, and as if by contraction of its substance carrying with it the food, especially smaller portions—even diatoms.

The *Amœba Radiosa* has very much less varying change of form than the other and the pseudopods are projected more like rays, being narrow and pointed. The smaller individuals with lobed processes are most frequently observed by myself. It does not seem to be certain whether these are younger individuals of the same species as *A. Proteus* or not, but they seem to me different, have less color and are more simply granular. When the *Amœba* is irritated from any cause, as the presence of irritating substances in the surrounding liquid, or of unusually cold temperature, it draws into itself all out-lying processes, assumes the spheroidal form, and if the irritation continues throws about itself a protective wall.

The mode of reproduction is said to be by division. Certainly this is *one* of the modes that have been observed. A portion of its protoplasm is projected like a pseudopod and afterward, by a gradual process of constriction, becomes entirely separated from the main portion. A contractile vesicle arises and a new individual is formed.

If we now consider briefly the life history of the *Amœba* we find in this simple entity the starting point of the nucleated *Protozoa*. But here is nothing but *living* matter in every part ; no trace of what is called "formed material," nor of the so-called differentiation of tissue. We find nothing but protoplasm and nucleus. In brief we have a simple naked cell without a wall or true enclosing membrane. There is neither muscle nor nerve developed, but none the less must the unformed elements of nervous and muscular tissues exist in every part of its living matter, for we find this little creature has sensation and motion, and in the procuring of its food we see also the phenomena of prehension in a certain sense, also of digestion, growth and reproduction. So in its life history it manifests a perfectly independent existence. However, just so truly is it a prototype in essential characters of some of the cells of the *Metazoa* or many-celled animals—these latter even having freedom of motion under some circumstances.

It is quite well known that the white blood-cells have these same peculiar movements which are so like those of the *Amœba* that since their discovery they have been distinguished as "amœboid." They are also spoken of as "wandering" blood-cells. When from any cause the blood-current becomes sluggish, as from some irritating influence, these blood-cells while under observation work their way through the walls of the blood vessels, sending out their finger-like processes like the pseudopods of the *Amœba* in advance ; thus they gain their way into other tissues. There are also other points of parallelism with certain young cells which have given to the *Amœba* the interesting prominence assigned it by scientists.

ROCHESTER, N. Y.

THE PRESERVATION OF ALL THE NATURAL TEETH.

BY JOHN T. CODMAN, D. M. D.

Whatever I may present on this subject must be in the nature of hints rather than generous display of knowledge, and no attempt whatever will be made to cover *all* the ground that might be occupied to advantage. I promise to be brief and not trespass too much on the reader's time.

I take the ground that we as dentists should try to preserve all the natural teeth, and that this is our first duty.

Two professions at least should have something to say of the relations of the teeth to the system, to the health of the human body. These professions are represented by the man of anatomy, physiology and hygeiene, and the dentist. The first should by the study of these kindred sciences, be able to determine accurately the true physiological and physical conditions that must of necessity produce, develop and preserve teeth of fair structure. A study of these conditions will require a life time—must be continued from generation to generation until they are thoroughly understood and perfected. As to the second, the dentist, it is well that he should know all that the first knows or can know of these subjects, but this cannot be expected. The dentist's art absorbs his time and energies. The study of materials, the exercise of mechanical dexterity, and the daily toil for sustenance gives him enough to do as dentist, without trespassing too far on ground that belongs more properly to another.

Now I know the reader will think it presumptuous in me to propose to save all the natural teeth, and yet I think that to be our duty and no more than we should all strive to accomplish. I grant that there are exceptions. As a sensible man I admit them, but these exceptions, to a true student of dentistry, grow less and less as time and study go on. Dr. Flagg's " unbroken arches " will not in the future be such fabulous things to us or to a majority of the profession, who can hardly now believe his statement a truthful one. I certainly can believe it not only possible, not only probable, but certain that with right materials, rightly used, thousands of teeth that to-day we are called upon to extract, may be preserved to a " good old age."

Then why are they lost? Simply because we are too ignorant to save them, or because we do not make the attempt. What is the condition of the teeth we are called upon to extract? In general, they are aching teeth, broken down teeth, or loose teeth. The greater portion are aching teeth, aching from inflammation of the pulp. This comes from various causes, such as disturbed constitutional conditions, stomachic, nervous, or otherwise. If these are reduced the pain disappears. If the pulp regains its health the tooth may be preserved. If the pulp is diseased it may be destroyed, the root treated, and without a great deal of labor the tooth saved for years. Another portion are abscessed teeth. If the abscess is slight, proper treatment will reduce it. If greater, then with right treatment the abscess will become benign and the tooth and surrounding parts return to the normal condition, with the possible exception of a fistula that may heal after a while. Broken down teeth and roots deserve more thought and care than is usually given them. Why extract such when they are not troublesome? This always produces shrinkage. When taken out, the arch that should be kept full is broken, and a thin look of the features with sunken cheeks is the result. Clean them, fill them with some of the plastic fillings, such as gutta percha, amalgam or oxychloride of zinc, if not with gold. Loose teeth may be preserved often times for years even when they seem hopeless; I know it for I have proved it. This is not theory; it is what I have learned, what I try to do and accomplish in my practice.

If looseness is not occasioned by tartar, some other condition will be found that has raised the tooth or lowered it from its place in the socket. The strain produced by the closing of the jaws causes the forward and backward movement of this particular tooth and increases the tendency to elongate. The remedy is simple. File off the elongated tooth until free from its opponent. If necessary take some off of its mate in the other jaw. In this way return it to restful conditions and let nature finish the work. She will accomplish more than many give her credit for.

But in this connection comes a matter of greater importance, and one on which I may find more disagreement than on any other point —the extraction of the sixth year molars to make room. I disagree with many on this point and adhere to the proposition, long since advanced, that the extraction of teeth from either jaw produces a narrowing of the arch. It cannot be otherwise. Then how do you gain room by so doing? That we gain more room for teeth that still remain may be true, but I maintain that we have no right to extract for that purpose, except in very rare cases. "But," say some, "they are poor teeth and we cannot save them." If you cannot save them—if you cannot save teeth then do not call yourself a dentist. "But," say they, "if I take them out I prevent the other teeth from crowding, and crowding is what makes teeth decay." Is it? Let us see. When I am shown an old person with sound teeth, or reasonably sound teeth, not close together nor crowded, then I may believe; but my experience is that no person of, say seventy years, can show a set of natural teeth unless such teeth are close together or crowded to lapping.

I could continue to write in this way, but do not wish to; but I ask why the lower animals have good teeth and the human animal poor teeth? And asking this question brings us at once to the "acid theory"—the theory that stands the test better than any other. Sour mouths, sour stomachs, sour breaths, and I may add sour dispositions, are consistent with rotten teeth, slimy mouths *ad nauseum*, getting the better of tooth brushes, washes and tinctures every time.

Let us be radical as well as sensible and say what we ought to have said a thousand times: *The best diet of man is that which keeps his teeth clean and preserves them from decay.* As we are not physiologists, we do not know and have not studied the question of diet. We turn to those who have, to aid us, and demand of them to show us a diet that will meet all desired conditions. Let this be done and our work will stand, our fillings stay, and however crowded the teeth may be, such teeth will remain sound. I for one beg of any one to let me know and let the world know why I cannot have a diet that will keep my teeth as sound as those of the horse, as white as those of the dog, as clean as those of the cat. We as dentists will promise to double our zeal, to give our mechanical aid, our professional skill, as well as our hearts to our part of the problem if others will but do their duty by the part left to them.

In conclusion, I wish to say that sufficient attention has not been given the fact of the alteration of the shape of the face and the tones of the voice by the loss of the back teeth, and by the non-development of the dental arches. One of the great Italian writers on music says: "You cannot be a good singer unless you have all your teeth," or words to that effect. I wish this were inscribed in every household where the love of harmony exists. It is only by the development of all of the teeth that the mouth is formed for harmony. Only by the development of the jaw, produced by the presence of wisdom teeth, is the uvula and the soft palate lifted out of the throat to its proper, harmonious place. Looking at the subject in this light, let us be more cautious how we extract teeth—more careful and persistent in our efforts to preserve them.

Boston, Mass.

PHOSPHATE OF ZINC UNDER PRESSURE.

BY DR. J. REQUA.

Some experiments with phosphate of zinc fillings have shown that their density or hardness can be increased by pressure, if applied at the proper time during the hardening process. As any increase of this quality in these fillings will undoubtedly render them more durable, anything to be gained in that direction is worth our attention. Having practiced for some time the bringing of pressure to bear upon fillings as they were hardening and when it was practicable to do so, with the idea that they were harder and better for it, I concluded to experiment for the purpose of demonstrating the point.

A brass tube, one-fourth of an inch in diameter and one-fourth of an inch deep, was so constructed that after being filled a piston with any required number of pounds pressure could be brought to bear upon it. The filling after becoming hard could be punched out and others made in this artificial cavity.

To test its integrity each filling was placed upon a hard wood block and subjected to the pressure of a flat-faced round punch, one-eighth of an inch in diameter, and worked by a lever in such a way that the exact number of pounds that bore upon the punch was easily determined. In each case the weight was gradually increased, the filling remaining intact until the crushing point was reached, when it flew into fragments. The material experimented with was the Caulk's Diamond Cement, sold by Davis & Leyden.

Following is the result of twelve tests in the order in which they were made, giving the kind and amount of pressure applied for about two minutes while hardening, and also the crushing weight in pound :

No. 1	Without pressure	120
" 2	Pressure of spatula	155
" 3	Pressure of finger	190
" 4	Without pressure	150
" 5	Fifteen pounds pressure	175
" 6	Twenty pounds pressure	190
" 7	Pressure of finger	195
" 8	Without pressure	145
" 9	Thirty-five pounds pressure	245
" 10	Withoat pressure	145
" 11	Pressure of spatula	190
" 12	Pressure of finger	172

The finger pressure was made by pressing the finger directly upon the filling after it had become a little stiff ; the spatula pressure was made in the same way. In the mouth, of course, only the finger and spatula can be used.

In regard to these results, if hardening under pressure of the finger renders this material capable of sustaining 15 or 20 or 30 per cent. more weight without crushing, it is reasonable to conclude that it would also better withstand the wear and tear of mastication.

ROCHESTER, N. Y.

CONVENTIONAL (DENTAL) DECORUM !

"I *do* so love to meet with dentists ;
Methinks I'll seat me here."—*Loving Brother.*

Dr. Black introduced * * * illustrations of the various forms of alveolar abscess, and abscesses of the face and mouth, painted on a black ground, in water colors and India ink.

Accompanying the exhibition of the pictures, the doctor gave a general description of each form, the symptoms, diagnosis, modes of treatment, etc.

Dr. Crouse criticised Dr. Black's drawings on account of the preciseness with which the location of fistulas and the sizes and positions of cavities in the bones produced by abscesses were represented, and said that he did not believe that in actual observation one could tell so exactly about such things, and objected to such *hypothetical* representations as being misleading to young men who would be discouraged when they found that they could not tell so exactly the precise condition of their cases. He thought there must be a very unusual number of cheek and chin fistulas in Jacksonville in order to have so many of them occur in one man's practice, within two or three years, as Dr. Black had described. Had himself seen but very few indeed.

Dr. Talbot: I am ashamed of the last speaker. When a man has taken so much pains to prepare such careful drawings and descriptions of actual cases occurring in his practice, it is an outrage to have their accuracy discredited and their value depreciated without any reason for so doing. Dr. Black has doubtless had such cases to treat, because his ability to do so successfully has become known. As to their being so very rare, at least one of them, and often more than one, can be seen every week at the Saturday clinic at Rush Medical College.

Dr. Talbot was cheered, and his rebuke to Dr. Crouse evidently carried the approval of the assembly.

Dr. Crouse replied that the young man was fresh from Rush Medical College, and doubtless in a hospital or infirmary such cases may be often seen, but was not aware that Dr. Black was connected with any such institution.

Dr. McKellops, of St. Louis: There are few men who have been a long time in practice that will fail to have seen examples of all the classes of cases illustrated by Dr. Black. It is very wrong to bring a wholesale accusation of inaccuracy against such carefully made drawings as these.

Dr. Sturgis: I think no harm has been intended by my friend, Dr. Crouse. Those who know him well know that he sometimes says more than he means, and is a little addicted to joking, but he was not courteous to Dr. Black.—*Proceedings of Illinois State Dental Society.*

DENTAL ASSOCIATION OF THE UNITED STATES OF AMERICA.

We give a synopsis of the constitution of this new organization, which was read, considered, and adopted August 11, 12 and 13, 1880, and on motion referred, for revision and report at the next Annual Meeting, to the following Committee: Drs. J. B. Rich, Chairman, E. S. Chisholm, R. B. Winder and R. Finley Hunt:

This organization shall be known by the name and title of "The Dental Association of the United States of America," having for its objects the advancement of the profession, the extension and perfection of researches and investigations, and improvement in every respect; all of which it hopes to accomplish by the union and concentration of the talents and labors of members of the profession generally. Its further objects shall be the procurement of recognition of the profession by the United States Government, and the obtainment of its aid and co-operation in the collection and collation of ethnological statistics bearing on the development, structure, and condition of human teeth.

The United States is (or *are* according to the politics of the reader) divided into districts as follows:

No. 1. New York, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine.

No. 2. New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, Virginia, West Virginia, Kentucky, and Ohio.

No. 3. North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Arkansas, and Tennessee.

No. 4. Indiana, Illinois, Iowa, Missouri, Nebraska, Kansas, Dakota, Minnesota, Wisconsin, and Michigan.

No. 5. California, Nevada, Utah, Arizona, New Mexico, Colorado, Wyoming, Montana, Idaho, Washington, and Oregon.

The future membership shall be of dentists who may be elected upon application, which application shall be accompanied by credentials of membership in a State society, or by a recommendation from five members of this Association or of his State society. When applications shall have been properly reported upon, a ballot shall be had and a majority of three-fourths of those present shall elect.

No person commencing the practice of dentistry after this date (August, 1880,) shall be eligible to membership unless he shall have received a diploma from some reputable dental college.

This Association shall hold its meetings annually. Every fourth year the annual meeting shall be held in Washington, beginning with and from the annual meeting in 1882. The other meetings shall be held in rotation.

The officers of this Association shall be a President, five Vice-Presidents, a Secretary and Assistant Secretary, and a Treasurer and Assistant Treasurer, and shall be elected by ballot.

The President shall preside at all meetings of the Association; the Vice-Presidents shall assist the President with their advice and counsel.

The Secretary shall reside in the city of Washington, and shall have charge of and keep properly all the records, archives, and properties of the Association. He shall conduct all correspondence of the Association, and make a report of the same at each annual meeting. He shall, with the aid of the Assistant Secretary, keep a correct record of the proceedings of each annual meeting, and prepare the same for publication. He shall be, *ex officio*, Secretary of the Committee on Correspondence with the United States Government.

The Assistant Secretary shall be present at the meeting held in his District, and shall record for the Secretary the proceedings of such meeting.

The Treasurer shall reside in Washington, and shall have charge of the moneys and accounts of the Association, keep a correct account of the same, and make a report of them to the Association at each annual meeting.

The Assistant Treasurer shall be present at the meeting held in his District, receive all money paid in at that meeting, and pay the same to the Treasurer.

For the purpose of proper and thorough research and investigation, the subjects pertaining to Dentistry will be divided and classed as follows:

1. Dental Surgery.
2. Artificial Dentistry.
3. Anatomy and Physiology.
4. Pathology.

5. Histology and Microscopy.
6. Therapeutics.
7. Materia Medica.
8. Physics.
9. Chemistry, Organic and Inorganic.
10. Metallurgy.
11. Dental Education and Literature.

Each one of these subjects shall be in charge of a Section, to be composed, ultimately, of———members.

Each Section shall, to the best of its ability, investigate the subject which it has in charge, and report the result of its investigation to the Association at each quadrennial meeting held in Washington.

The following shall be the standing committees of the Association:

Committee on Finance.

Committee on Membership.

Committee on Appliances.

Committee on Correspondence with the United States Government.

Executive Committee.

The fee for initiation into this Association shall be five dollars.

The annual dues of each member shall be one dollar.

The document in full may be had on application to Dr. R. Finley Hunt, Washington, D. C.

A NEW MOTOR FOR THE OPERATING-ROOM.

A few days ago I went with a party of the Manchester Scientific Students' Association to the works of W. Bailey & Co., Salford, Manchester. Amongst other things, I saw a small hot-air engine, about the size of a cigar box and quite as portable. The motive power is obtained by the alternate heating and cooling of about three or four cubic inches of air—the same air being constantly heated and cooled without change. The heat was supplied by an ordinary small spirit lamp, and the power available was evidently ample to work a burring engine or a sewing machine. The same engine (Lehmann's patent) is made in large sizes, but the one I refer to was the prettiest adaptation of a small motive power I have ever seen. About ten seconds after the lamp is put under one end of the engine, the fly-wheel commences to revolve, and the most astonishing part of the thing is the great power developed by such a tiny flame as is required. Mr. Bailey informed me that the cost of the larger sizes for fuel is about two pence to three pence per horse power per day, and that for this cost not only is the power provided, but also that all the heat not converted into mechanical energy can be utilized in providing a constant supply of hot water. The small model I specially refer to has a water jacket round one end of the cylinder containing some six or eight ounces of water. This in one and a half to two hours becomes heated sufficiently to reduce the power of the engine considerably, and requires a little time to cool. In the larger engines, a circulating arrangement is used which changes the water as it becomes heated, and a similar arrangement can be connected to the small size when it is necessary to use the power continuously the whole day through.

As these small motors are quite new, none having been yet sent out, the cost has not yet been definitely fixed ; but as the whole affair is so simple, it cannot be any great amount.—Fletcher, in *British Journal of Dental Science.*

RECENT DECISIONS RELATING TO PATENTS.

U. S. CIRCUIT COURT—SOUTHERN DISTRICT OF NEW YORK.

Manufacture of Celluloid—Daniel Spill vs. The Celluloid Manufacturing Company.

(Decided May 25, 1880.)

Blatchford, J. : This suit, on the proofs, involves two patents granted to the plaintiff. One is No. 97,454, granted November 30, 1869, for an "improvement in dissolving xyloidine for use in the arts." The specification states that the "invention relates to the preparation and use of certain solvents of xyloidine, and which differ from the ordinary known solvents of xyloidine, in that these menstrua which are employed are not, necessarily, in themselves, solvents of xyloidine, but become so by the addition of the bodies, compounds, or substances herein referred to." It also states that the invention consists in the employment of eight different solvents. Only the second solvent is alleged to have been used by the defendant. It is thus described in the specification : "Camphor or camphor oil, or mixture of the same, in conjunction with alcohol or spirits of wine, the same to be employed in about equal proportions." The claim is in these words :

"The preparation and use of solvents of xyloidine, such as have been before described, so as to render xyloidine more easy of conversion into compounds containing xyloidine, which are suitable for application in the arts and for industrial purposes."

The defendant has infringed this claim by using camphor in conjunction with alcohol, as a solvent of xyloidine. The defendant mixes ground and dried xyloidine with pulverized dry camphor, and then immerses the mixture in alcohol until the xyloidine is dissolved. It is dissolved by the joint action of the camphor and the alcohol. Neither alone is a solvent of xyloidine. It is immaterial, so far as the invention and the claim of the patent are concerned, whether the camphor and the alcohol are mixed so as to dissolve the camphor in the alcohol and then the xyloidine is put into the solution, or whether either the alcohol or the camphor is first mixed with the xyloidine and then the third substance is added. The bringing of the three together, causing the xyloidine to be dissolved or softened, so as to be more easy of conversion or working into compounds or articles containing xyloidine, is the invention. Making use of the solvent power of camphor and alcohol, when in the presence of each other and of the xyloidine, is the essence of the invention. The use of the camphor and the alcohol in about equal proportions is not of the essence of the invention. They are stated by the patentee to be useful in these proportions. But the evidence shows that the real invention was the discovery of the fact that camphor and alcohol, when united, would be a solvent of xyloidine.

The novelty of the invention of this solvent is attacked, but without success. The evidence is voluminous, and has been carefully considered, with the result, that the defendant has failed to show want of novelty. The prior patents adduced and examined are the

English patent to Cutting, No. 1,638, of 1854; and the English patents to Parkes, No. 2,359, of 1855; No. 2,675, of 1864; No. 1,313, of 1865; No. 1,695, of 1867; and No. 1,614, of 1868. Parkes' pamphlet of 1867, and Gmelin's Hand-book of Chemistry, of 1860, have also been considered, as well as the English patent to the plaintiff, No. 2,666, of 1867. No other anticipation than the above seems to be considered by the defendants' expert, and he does not allude to the pamphlet. Another defense relied on is, that one Parkes communicated to the plaintiff, in England, the knowledge that alcohol and camphor united were a solvent of xyloidine, and that the plaintiff never made the invention himself. On the whole evidence, the defendant has failed to establish this defense.

The other patent involved is No. 101,175, granted to the plaintiff March 22, 1870, for an "improvement in the manufacture of xyloidine and its compounds." There are five claims in the patent. The second alone is alleged to have been infringed. The specification says: "The second part of my invention relates to the bleaching of xyloidine, and is as follows: When it is desired to bleach or whiten the xyolidine, I bleach it directly after the removal of the acids, and before removing it from the vat. This I do by any of the well known means, preferring a solution of chlorine or a solution of chloride of lime or soda, which I add to the xyloidine, making use of alternate stirrings and rests, for a sufficient time, until the xyloidine is whitened. The solution is again drained off, and the xyloidine is repeatedly washed with water, in order to remove any excess of bleaching agents or any residue from such agents, when it will be found to be ready to be submitted to pressure in order to free the same from water, and may then be opened out, so as to prepare it for drying, dissolving, or other purposes." The second claim is in these words: "The process of bleaching xyloidine in the manner herein specified." That portion of the specification which precedes the statement of the second part of the invention relates to the treatment of vegetable fiber or lignine with acids, to convert it into xyloidine and render it soluble in suitable solvents. The fiber is intimately mixed with the acids by appropriate means, then the acids are strained and pressed from the fiber, which is now xyloidine, and it is subjected to a washing and stirring with water until it is nearly or quite free from acids, and the water is then drained off. The washing is done in a washing vat. The bleaching, as before stated, is done "directly after the removal of the acids," and before the xyloidine is removed from the vat. The evidence shows that the real invention of the plaintiff in this regard was to bleach xyloidine by ordinary bleaching agents, directly after the converting acids had been washed out of it, and before anything had been mixed with it which might interfere with the action or the bleaching agents. This is, fairly, the sense of the specification. Whether the bleaching is done in the washing vat or not, or in a solution of the ordinary bleaching agent, or by such agent not in a solution, are immaterial matters. The essential discovery was, that an ordinary and well known bleaching agent, of the character of chlorine, or chloride of lime, or chloride of soda, if applied to xyloidine, when it had become such and had been freed from the converting acids, and while it remained in that state, would act upon it to bleach it. The defendant treats paper with acids to make xyloidine, then washes out the acids, then grinds it, and, while it is being ground, applies bleaching powders to it. The evidence is satisfactory, that one of such bleaching powders is permanganate of potash, and that it was a well known and ordinary bleaching agent at the time of the plainttff's invention. Therefore, infringement is established.

It is contended for the defendant that the claim in regard to bleaching does not claim a patentable invention, because it is merely the use, to bleach xyloidine, of what had been before used to bleach fibrous material not converted into xyloidine. The true view is well expressed by Professor Seeley, the plaintiff's expert. The defendants' expert, Mr. Edward S. Renwick, had cited four English patents, those to Martin, No. 7, of 1864; to Reeves, No. 2,797, of 1860; to Collyer, No. 550, of 1859; and to Reeves, No. 3,293, of 1866, as describing the treatment of vegetable fiber with a solution of chloride of lime or of soda, substantially as the plaintiff's patent describes xyloidine as being treated with a solution of chloride of lime or soda. Professor Seeley says:

"The patents referred to by Mr. Renwick cover inventions relating to bleaching, by means of ordinary bleaching agencies, the ordinary fibrous substances which are used for clothing, paper stock, etc. I do not find in them anything, which has more bearing upon the novelty of Spill's invention than what might be included in the matter which Spill regards and defines as old and well known. Previous to Spill's time, the ordinary bleaching materials and methods were only applied to a peculiar class of substances, namely, those substances of fibrous character which were useful only by reason of that fibrous character. Spill's invention brings the utility of bleaching upon a new kind of material, and brings it where it is very desirable, but where it was supposed to be impracticable. It is true that pyroxyline (xyloidine) has a fibrous structure, but this fibrous structure is not any essential or useful property in it. In fact, in this art, pyroxyline does not become useful until the fibrous structure is destroyed. Pyroxyline is not useful for any of the purposes to which the materials formerly bleached were applied. Pyroxyline is very different, in chemical character and composition, from the old bleachable materials. If pyroxyline had not the fibrous structure, probably the question of invention in this case would not have arisen, for then it would have appeared plainly that the case would have been very similar to that of (suppose) bleaching charcoal by ordinary bleaching agents. In the absence of experiments, the bleaching of a substance like pyroxyline would seem impracticable, almost incredible. The theory of ordinary bleaching is, that the coloring matter of goods to be bleached is of a complicated and unstable character, and is destroyed by the powerful chemical action of the bleaching agents, chlorine, oxygen, etc. Inasmuch as pyroxyline, in its manufacture, has been exposed to the action of some of the most powerful chemical agents which are known, it is unreasonable to suppose that any of the unstable coloring matter could be left in it. The bleaching of pyroxyline has often been proposed and attempted ; it was especially desirable in this art ; but it is my opinion that a chemist would exhaust all other theories before he would think of ordinary bleaching agents for the purpose. The subject had come up in my mind several times before Spill's invention, and I was unwilling to credit the efficacy of his plans until they were actually demonstrated to me. I know of very few inventions where so novel and useful results have been obtained by such simple and unlooked-for methods." There is no evidence to countervail this view.

The defendant has introduced evidence for the purpose of establishing that the invention claimed by the plaintiff in regard to bleaching xyloidine was previously known to Parkes, and was communicated by him to the plaintiff, and was not in fact invented by the plaintiff The burden of showing this is on the defendant, and, on the whole evidence, it has not succeeded in doing so.

The defendant claims to have shown that other inventions claimed in the two patents were not new, so as to affect the question of costs. But the attempt cannot be held to have been successful.

There must be the usual decree for the plaintiff, for an account and an injunction, as to the claims above held to have been infringed, with costs.

Horace M. Ruggles and Edwin M. Felt for the plaintiff.

William D. Shipman, Henry Baldwin, Jr., and E. Luther Hamilton, for the defendant.—*Scientific American.*

CERVICO-BRACHIAL NEURALGIA CURED BY EXTRACTION OF A WISDOM TOOTH.

On the 18th of February I was consulted by a patient who was suffering from severe neuralgic pains in the left temporal region of the head, and extending to the neck and arm on the same side. The patient described the pains in the neck and shoulder as being so severe as to interfere with the use of his arm.

Judging the pain in the temporal region to proceed from reflex irritation of the "auriculo-temporal nerve," caused by its connection with the "inferior dental," both belonging to the third division of the fifth pair of nerves, I determined to extract a decayed left lower wisdom tooth, and on doing so completely relieved all the pains. The pulp of the tooth was in a state of chronic inflammation.

Now, although the implication of the cervical and brachial plexuses in neuralgia caused by carious teeth is a fact well known to dental surgeons, I have never been able to obtain a satisfactory reason how it is that these nerves, which are spinal, should be affected by irritation of the maxillary nerves, which are cranial.

While perusing my anatomical studies on the head and neck, I made it my business to endeavor to find out any communication which might exist, either normally or abnormally, between the maxillary nerves and the cervical and brachial plexuses, but could trace no connection at all, and to the repeated and persistent questions which I put to the demonstrator of anatomy on the subject, I could get no more satisfactory answer than, "We know the sympathy between these nerves to be a practical fact, but have no means of accounting for it."—MUSGRAVE, in *British Journal of Dental Science.*

FATAL CARELESSNESS.

On Tuesday last Eddie Hempbel, the son of Charles Hempbel, who resides at No. 6 Hawkins street, died from the effects of an illy extracted tooth as is stated by the attending physician. The facts of the case it seems are these: The little boy had been troubled with the tooth ache and his father took him to a German barber-dentist by the name of Gartman, corner of Franklin and Clinton streets. Gartman had extracted teeth for Mr. Hempbel previously and no trouble had ensued from the operation. After the tooth had been extracted the boy was taken home, but his face commenced swelling almost immediately. The next day Mr. Hempbel summoned Dr. Wilbur, who examined the boy and pronounced an abscess in formation and said that he would lance it the next day. Upon calling the day following the abscess had disappeared, evidently breaking, and the pus absorbed by the blood. The boy from this time began to get worse and Dr. Wilbur called in Dr. Koch for consultation. Their efforts proved of no avail and the boy died on Tuesday, nine days after being taken sick. The disease is specified among physicians as hospital fever, or a lighter stage of gangrene. The cause is attributed to the unclean condition of the instruments used by the dentist, it being very dangerous at this time of the year to use surgical instruments of any kind after an operation has been performed with them, unless they have been thoroughly cleansed and washed with carbolic acid.—*Sunday Morning Herald.*

THE Illinois State Dental Society is a live isntitution. Its proceedings are already in course of publication in the *Missouri Dental Journal.* Other societies might profit by its example.

EPILEPSY CAUSED BY DISEASED TEETH.

Having read the report of Dr. Brunton's excellent paper on "Nervous Diseases connected with the Teeth," and the discussion that followed, I venture to think that the following decided case of epilepsy caused by diseased teeth, which came to my personal knowledge so recently as Saturday, the 17th ult., may be of interest to some of your readers :

A woman, between forty and fifty years of age, came to me to have the right second molar extracted, which I did. She recalled to my memory the circumstance of my having extracted the corresponding tooth on the opposite side six months previously, and told me that, up to that time, for two years she had been subject to fits, having six or seven in a week and so severe, that (using her own words) she was sometimes as "unconscious as death for four hours." Two or three days after the tooth was taken out she had one fit, but has been perfectly free from them since, although six months have elapsed. Her medical attendant cautioned her not to have the tooth extracted. She came to me contrary to his injunctions, the tooth was removed, and the fits quite ceased.—Kekwick, in *British Journal of Dental Science.*

ODDS AND ENDS.

A Simple and Efficient "Bleachant."—Strong *spirits of camphor* is an excellent bleachant ; it is very effective in a short space of time. It dissolves the pigment within the cells, as well as permeating the hard tissue, leaving no bad results. So much of the dentine should be removed as may be safe to do. The rubber dam should be in position, and the spirits of camphor applied for such time as may be requisite to attain the end desired.—Wetherbee, in *American Journal of Dental Science.*

Holding Rubber-Dam.—For holding the rubber-dam, I clean the surface of the tooth from mucus by rubbing it with pumice stone, and then after applying the dam and drying thoroughly, apply to the tooth a piece of spunk, having a drop of thick sandarac varnish upon it. It will quickly dry enough to stick, and will adhere to the tooth with great tenacity. Have only a little varnish and apply neatly so that the spunk may stick to the tooth only, and not to the rubber.—Crouse, in *Missouri Dental Journal.*

Soap as a Lubricant in the Mouth.—A little soap, rubbed on the gilling-twine, will be found quite as efficient as wax in assisting its passage between crowded teeth when adjusting the rubber-dam, and much more cleanly. It is also an efficient lubricant to the separating file. Rubbing the back of emery-cloth strips or corundum tape with dry toilet soap enables them to pass freely between teeth so close together that otherwise they could not be used, and, while greatly reducing the friction, does not impair their usefulness.—Cadwallader, in *Dental Cosmos.*

Finishing Fillings.—A special point about finishing fillings, and one often neglected, is to cut away *enough* of the gold, so that there will be no thin portions left overlapping the margins (this applies to both approximal and grinding surface fillings), and it sometimes requires very close scrutiny to determine just when all the overlapping gold is removed, and it cannot be properly done at all unless the border of the cavity has been well prepared in the first place. Then, of course, the work should be left smooth and well polished, if an approximal filling ; in grinding surface, if smooth and not overlapping the margins, a *polish* is of little consequence.—Noyes, in *Missouri Dental Journal.*

Taking Impressions.—For several years I have discarded plaster for taking impressions, preferring pure yellow wax. I had two reasons for doing so : 1st. Plaster at the operating chair is uncleanly, of a disagreeable taste, and small particles are apt to fall into the throat. 2d. In the case of a hard palatine ridge, with the neighboring parts soft, and in other difficult cases, a plate made from a plaster impression seldom fits the cast, being a perfecct *fac simile* of that portion of the mouth. The wax presses upon the soft parts and yields to the hard, thus giving a plate which will not rock. An impression cup of the proper size should be selected. The wax should be carefully softened to a plastic consistency, care being taken to not overheat it ; and when it is over-heated, not to pour cold water into the hot, in order to lower the temperature. If this is done, an imperfect impression will be the result.—Tees, in *Dental Office and Laboratory*.

Keeping Rubber Plates Clean.—Dr. N. W. Kingsley is reported as having said that one of the greatest disadvantages of rubber plates is "the impossibility, almost, in ordinary hands, of keeping rubber absolutely clean;" that out of a thousand sets that came into his hands after having been worn, but one was absolutely clean. He believes the absence of cleanliness to be the cause of the sore mouths we occasionally meet with. Although the statement is rather broad, I believe it to be in the main correct, and I think I can point out the reason why: not one set in twenty is properly hardened in vulcanizing; consequently the polish wears off easily, and then to keep such a set clean is impossible. A set of teeth vulcanized at 320° for fifty-five minutes as recommended by the manufacturers is not fit to enter anybody's mouth. On the other hand, a set of teeth well hardened and highly polished can be kept clean as easily as a gold set, and far easier than celluloid.—Guttman, in *Dental Cosmos*.

CONDUCTORIAL.

OUR ENTERPRISE.

Some will remember that our "Salutatory" ran as follows: "At the end of the year it [The Odontographic Journal] will be enlarged and continued as a quarterly, or increased in size and issued as a monthly. Its success in its present form will determine these things in the time stated." It's success *seems* assured. We say "*seems*," for it is a very easy matter to misinterpret the "signs of the times." But if our paid-up subscription list, which contains 1,700 names, and the constantly increasing demand for space in the advertising department have a meaning, it must be that the Journal is, for the present at least, a factor of some account. This much granted we proceed: The contract made by the publishers with the printer called for a thirty-two page journal, but just before the issue of the first number it was thought best to make it thirty-six. The second number contained forty pages, and now we come before our readers with fifty-six. One-half of each number is "devoted to the interests of the profession;" the other half to the interests of our advertisers. It is our intention to adhere to this "'alf and 'alf" rule until circumstances make a change necessary.

We desire also to call attention to the publishers' notice on the slip next the front cover. There it will be seen that they offer the JOURNAL for one year for the sum of one dollar, giving as a premium a package of Caulk's Diamond Cement, or one-fifth ounce of Plastic Flint Stopping, or one-third ounce of Sterling Amalgam. Though not so "nominated in the bond," the subscriber gets his JOURNAL for nothing.

A word to our advertisers and we have done. Our quarterly edition of the JOURNAL is 4,000 copies, or 12,000 copies to date. The January edition will not fall below this number, and may exceed it. The publishers are determined that every dentist in the land (and some out of it), shall have at least one copy—more if he becomes a subscriber.

NATIONAL MEETINGS.

As most of our readers are aware, the American Dental Association met at Boston, early in August, and held its 20th annual session. Numerically and socially it was one of the best sessions ever held. Everything possible was done by Boston dentists and Boston officials to make the occasion pleasant and profitable, and that they succeeded thoroughly is a fact in the history of the Association. Professionally it fell short of the average sessions. Why this was the case we do not pretend to know. It occurred to us, however, that too much time was devoted to the discussion of "my motion" and "my amendment," "cohesive *versus* non-cohesive gold," etc. After hours of talk on "gold," nothing more had been accomplished than a repetition of what may be heard, and what has been heard session after session for years, in our local societies. In fact such questions are better discussed in local than in State or National gatherings. They are petty, and had better be left with "us little fellows in the country," while members of the more important bodies give their time to the discussion of the great facts and principles of dentistry, and of which said "little fellows" are supposed to know next to nothing. So much time was consumed in the discussion of these little things that such excellent papers as those read by Drs. Brackett, Barrett, Odell and others, passed by all but unnoticed. Some discussion was had upon them of course, but for the most part it was irrelevant. Those who participated in the discussion had evidently worried themselves out on account of nothing, which left them wholly unprepared to discuss questions requiring close attention. Much more might be said, but we content ourself with the suggestion that the quibbling member, no matter where he happens to announce himself, he effectually and for all time "snuffed out." The next meeting will be held in New York.

In New York a week later, a mass convention of dentists resolved itself into the Dental Association of the United States of America. From the first it was evident that three classes were well represented. Those who thought a new National Association a necessity ; those who thought one such association enough, and those who thought the number immaterial. Those representing the first class came fully determined to organize such an association ; those representing the second came equally determined to prevent the organization of such an association, or emasculate it if formed ; while those representing the third merely dropped in to "see the fight," These last were more than pleased, and pronounced the meeting the *Rich-est* they had ever attended. An organization, however, was finally effected, a constitution—a synopsis of which may be found on another page—adopted, and officers for the ensuing year duly elected.

As there has been much said about the "sectional" character of the American Dental Association, we give herewith the dates and places of its meetings, all but two of which have been held North. The Association has rarely held its meetings South, and for two reasons ; 1st. on account of the pressure of business in winter, the only time when a corporal's guard of Northern men would care to go South; and 2dly, on account of the intense heat of the summer months, when, as all know, it is quite hot enough at home. Dull seasons and a tolerably comfortable climate are at the bottom of these apparently "sectional" meetings.

The meetings have been held as follows:

1860—Washington, D. C.
1862—Cleveland, O.
1863—Philadelphia, Pa.
1864—Niagara Falls, N. Y.
1865—Chicago, Ill.
1866—Boston, Mass.
1867—Cincinnati, O.
1868—Niagara Falls, N. Y.
1869—Saratoga, N. Y.
1870—Nashville, Tenn.
1871—White Sulphur Springs, Va.
1872—Niagara Falls, N. Y.
1873—Put-in-Bay, O.
1874—Detroit, Mich.
1875—Niagara Falls, N. Y.
1876—Philadelphia, Pa.
1877—Chicago, Ill.
1878—Niagara Falls, N. Y.
1879— " " "
1880—Boston, Mass.

Total number of meetings 20, divided among places named as follows:

Boston, 2.
Chicago, 2.
Cincinnati, 1.
Cleveland, 1.
Detroit, 1.
Nashville, 1.
Niagara Falls, 6.
Philadelphia, 2.
Put-in-Bay, 1.
Saratoga, 1.
Washington, 1.
White Sulphur Springs, 1.

But two of these meetings were held below that historic streak, Mason and Dixon's line.

JUDGE BLATCHFORD'S DECISION.

Inquiries as to the probable effect of this decision, which appears in full on another page, were kindly answered by the Secretary of the Company, as follows:

J. E. LINE, ESQ.—*Dear Sir:* Your postal card, 10th inst., to hand. I supposed your previous letter referred to our dental litigation.

The decision referred to in your last, was rendered in suit of D. Spill, of England, *vs.* us. He claimed infringement of patents held by him, and decision was in his favor. We expect that injunction granted will be set aside this fall, if not; we of course carry it to Supreme Court.

As to scope of suit and effect of injunction, it is only upon a *process* used in our manufacture and is of no importance to us. We have discontinued its use since injunction was issued and have substituted another in its place. The whole question is only between we two, and does not affect the material in any shape.

Yours truly, M. C. LEFFERTS, Sec'y.

HOSPITAL OF ORAL SURGERY.

The Trustees and Faculty of the Philadelphia Dental College, with a view to the more complete education of the Students of the Institution, will inaugurate, September 1st, in connection with the present Clinical Service, a hospital department, in which will be received and treated by operation or otherwise, all ward cases of accident and of disease or deformity of the mouth, jaws, face, throat and associate parts. The charge for beds per week will be three dollars, which charge will include nursing, to be done by volunteer students: board will be upon the European plan. Free beds for the poor will be increased in number as rapidly as circumstances permit.

If this scheme is fully carried out, it will be the means of interesting dentists throughout the country in a too much neglected study, and also secure for the surgical department of dental schools a large number of cases that would otherwise find their way into the hands of general surgeons. Prof. J. E. Garretson, dean of this college, is the leading spirit in this newest of departures, and all operations will, as heretofore, be performed by him, or by persons under his immediate control. Other schools will do well to establish similar departments.

WHO IS MY NEIGHBOR?

The following appears in the last issue of *Items of Interest:*

THE ODONTOGRAPHIC JOURNAL is a new Quarterly published by Davis & Leyden and edited by J. E. Line, D. D. S., Rochester, N. Y., price $1.00. Is n't the price too high? The *Cosmos*, for instance, is $2.50, published monthly and has more than twice the reading matter. Taking the ODONTOGRAPHIC JOURNAL as a standard, the *Cosmos* should be $15.00 a year.

Now we happen to be of those who believe that one good turn deserves another, hence the following:

Items of Interest is a four-page bi-monthly, published by S. C. Slade, and edited by the same gentleman and (we presume) T. B. Welch, M. D., Vineland, N. J., price 15 cents. Is n't the price too high? The *Dental Cosmos*, for instance, is $2.50, published monthly, and has more than twice the reading matter. Taking *Items of Interest* as a standard, the *Dental Cosmos* should be $15.00 a copy, which a very simple mathematical calculation makes $180.00 a year.

PERSONAL.

While in Boston attending the meeting of the American Dental Association, and "seeing the sights," it was our good fortune to be the guest of Dr. John T. Codman. We gladly make room here to acknowledge, and thank him for, the many personal and professional favors shown us on that long-to-be-remembered occasion.

While in New York a few days later, we met Dr. Geo. W. Field, recently of London. The doctor, though much out of health, is looking well and hopes to resume the practice of dentistry in this country before long. His London practice he disposed of to Dr. W. St. George Elliot, recently of New York.

We also fell in with Prof. James Truman, formerly one of the faculty of the Pennsylvania College of Dental Surgery. He has just returned from Germany, where four years' practice convinced him that American dentistry was more fully appreciated and better paid at home.

Our readers here-abouts will be surprised to hear of the return from Tucson, Arizona, of Dr. T. S. Hitchcock, whose address while a resident of this district was Seneca Falls. He is now in Brooklyn, and when once more settled will not practice as he did among the miners—in "top-boots and a red shirt."

NECROLOGICAL.

ROBERT ARTHUR, M. D., D. D. S.

Died, at Baltimore, Md., June 22, 1880, Dr. ROBERT ARTHUR, in the 60th year of his age.

Dr. Arthur was the oldest graduate of the Baltimore College of Dental Surgery, having been a member of the class of '40. After leaving this institution he practiced in Virginia and the District of Columbia, and then in Pennsylvania. While in Philadelphia he filled one of the chairs in the Pennsylvania College of Dental Surgery. He returned to Baltimore about '59 and continued in practice there till the time of his death.

Dr. Arthur contributed much to the literature of the profession, chiefly the journals. His "Prevention of Decay of the Teeth," which was issued about ten years ago, and which was misunderstood and misrepresented, was the beginning of a controversy the good and bad effects of which are still matters of daily observation.

BIBLIOGRAPHICAL.

We acknowledge the receipt of the following:

New York Surgical and Medical Journal.
Dental Cosmos.
Missouri Dental Journal.
Dental Office and Laboratory.
Dental Advertiser.

Announcements for '80–'81 of the Pennsylvania College of Dental Surgery, Philadelphia Dental College, and New York College of Dentistry.

Dr. Geo. H. Perine's "Historical Sketch of Dentistry from the Earliest Ages to the Present time, together with the Biography of Noted American Dentists," is nearly ready for publication. There will be added an appendix of dental patents to date.

American Journal of Obstetrics and Diseases of Women and Children, edited by Paul F. Munde, M. D., and published by Wm. Wood & Co., N. Y.

PECUM FIBRE for polishing fillings is now in market. It is advertised as "dental fibre."

FILINGS.

MR. R. S. Williams, of New York, has promised to put on sale a few knives and pads somewhat similar to those used by his employees in trimming gold foil. These instruments are preferable in every respect to anything made of metal, particularly for cutting the lighter numbers.

One who has been there says: The phosphate of zinc plastics are mixed to a *putty* consistency, look like *putty*, work like *putty*, are manipulated like *putty*, neither contract nor expand like *putty*, and, in short, are the *most beautiful* and *promising tooth putties* that he has ever seen.

A little girl, noticing the glittering gold filling in her aunt's front teeth, exclaimed: "Aunt Mary, I wish I had copper toed teeth like yours."

The American Academy of Dental Science will meet in Boston, October 27th. The annual address will be delivered by Dr. Joshua Tucker, one of the oldest and best known men in the profession.

Lime acts favorably on plaster, as it not only increases the rapidity with which it sets, but it gives it additional hardness. Plasters to which 10 per cent. of lime has been added are capable of taking a polish.

It is said that well-preserved human jaw-bones have been found in a cave near Decatur, Ohio, one of the marked peculiarities being a tooth back of the third molar. Another illustration of reversion to a former type.

A French journal tells of a woman who suddenly found herself at the head of a family of eight children, all "enclosed in a sac" and "perfectly formed." The article ends with "The mother did well." Yes, but how about the "old man?" Did he survive?

The other morning a Galveston merchant was seen standing in his store with his face tied up, and smiling like a house on fire. "What are you grinning for?" asked a passer-by. "I shoost sold out all mine old umprellas, und I feel so glad as never vash. Dis rainy vedder vash a plessing." "What's the matter with your jaw?" "My tooths ache so pad I vants to die. Dot rainy vedder always makes dot:" and as his thoughts went back to the sale of the umbrellas he put his hand up to his jaw and laughed, swore, stamped and smiled, until people passing took him for a lunatic asylum.

Dr. P. A. Palmer has issued a circular calling attention to "an entirely new plan of filling teeth," also to "a new form of pivot tooth." We have no personal knowledge of either, hence our inability to express an opinion. His address is 511 W. Madison street, Chicago, Illinois.

Mr. C. Loyd Morgan thus defines a theory: "A scientific theory in some respects resembles an organism, and especially in this, that it must harmonize with its environment or die. The environment of theory is fact. So long as a theory is in harmony with the known facts of nature, it can exist, the development of a theory being its modification in accordance with newly-discovered facts. When the plasticity of a theory ceases—when it refuses to accommodate itself to facts—its days are numbered and it must give place to a more fortunate rival in the struggle for existence."

The 7th and 8th District Dental Societies will hold a Union Meeting at Rochester, October 26th, 27th and 28th. The programme is as follows:

Sec. 1.—Anatomy, Physiology, Histology and Microscopy. Chairman, F. French, Rochester.

Sec. 2.—Pathology, Therapeutics, Etiology and Diagnosis. Chairman, F. E. Howard, Geneseo.

Sec. 3.—Chemistry, Materia Medica and Anæsthetics. Chairman, C. W. Stainton, Buffalo.

Sec. 4.—Surgical and Operative Dentistry, Education and Literature. Chairman, A. P. Southwick, Buffalo.

Sec. 5.—Mechanical Dentistry and Metallurgy. Chairman, G. B. Snow, Buffalo.

There will be in addition to and as a part of the above reports, a number of volunteer papers.

NÄBOLÏ.

The compound herewith offered to the profession, and which we call Naboli, is the result of careful and diligent experimentation for nearly two years after its possibility was assured to the mind of the discoverer, and it is now offered with the certainty of knowledge on our part that it will accomplish all that is claimed for it, and we are ready to demonstrate this fact in any case that can be presented where the patient is left unbiased to make a truthful statement of the result of the test.

It must be remembered that those who most desire to save their teeth and who give them most care, come from among the people whose modes of life and mental conditions have a tendency to exalt the sensibilities of the nervous system. People who live by brain work, or whose occupations are indoors, by this means reduce the natural powers of innervation : especially is this true of ladies. The departure from a natural neural or tonic irritability renders just in its degree the *person* susceptible to suffering. This condition almost always exists in one who approaches the dentist's chair laboring under the anxiety and apprehension of pain they are about to undergo. It should be then the first business of the dentist to calm the fears of the timid and apprehensive patient by such assurances as a full and confident belief, in his own resources, will permit.

This confidence will come to all dentists when they have become perfectly familiar with the use of the Naboli under all the varied circumstances that daily present themselves in a dental practice.

We have been taught that deep and quick cuts of the excavator were the most merciful, but he who has practised upon that theory will need to change his method if he would be successful with Naboli. There are two things to be considered : the pain which *may be caused* by the *improper* application of the agent, and the pain that is to attend the *unsympathetic* and forcible attempt at excavation where the teeth are in an exalted state of sensibility.

There are some very sensitive teeth that do not absorb this agent into the decalcified tissue with sufficient rapidity to produce pain, even if it is first supplied in full strength ; others will, under apparently the same conditions, suffer intensely from a full strength application. Hence it has been prepared in definite compounds, in the different degrees of potency, and these are indicated by the numbers 1, 2 and 3 ; No. 1 being the weakest and No. 3 the strongest. No. 4 contains a fluid for cleansing the cavity without restoring the tooth to its normal sensibility.

Dentists commencing the use of the same should at first have one box containing a full set of four bottles, but thereafter single bottles may be had to replenish the box from time to time, as may be required.

The Dennett Dental Näbolï Company,

BOSTON, MASS.

For sale at all of the Dental Depots.

Phenated Tooth Powder.

A DELIGHTFUL DETERGENT DENTIFRICE.

We offer under the above caption a new tooth-powder, the result of a series of experiments to secure the unquestioned advantages of phenic (carbolic) acid, in such combination that its objectionable odor should be overcome. We have succeeded in producing a powder which has met the unqualified approval of all who have tested it. It not only produces a peculiarly pleasant and persistent impression of coolness and cleanliness in the mouth, but is very efficient as a disinfectant aud deodorizer. We recommend as a delicious toilet article, and as very useful in scorbutic and aphthous conditions of the mouth and gums, and for the destruction of oral parasites. As a powder for general use by old and young we know of no equal to it in the market.

Put up in one-quarter pound, one-half pound and four pound tin cans.

PRICES.

4-lb. Tin Cans	each	$5.00
1 " " "	"	1.50
½ " " "	"	.90
¼ " " "	"	.50

MANUFACTURED BY

TRUSTEES OF SAMUEL S. WHITE.

DENTAL DEPOTS:

Philadelphia, New York, Brooklyn, Boston, Chicago.

Catalogue of "Specialties for the Mouth," sent on application.

THE

Odontographic Journal.

VOL. I.——*January*, 1881.——No. 4.

THE VALUE OF ELECTRICITY IN THE PRACTICE OF DENTAL SURGERY.

BY GEORGE H. PERINE.

There is perhaps no element or power with which science deals, the nature of which she is so little acquainted with, as electricity—that mysterious agent through whose medium thoughts are flashed from continent to continent, light produced which is only surpassed by the solar rays, machinery propelled, and last though not least, human suffering alleviated and in many instances permanently removed. True (it cannot be denied) but the employment of electricity as a curative agent has been attended with some disappointments, yet, in the majority of instances where its aid has been invoked, particularly where the trouble has arisen from a disordered state of the nerves, its use has been attended with the most complete success. The earliest experimenters, among whom may be mentioned Aldini, Hufeland, Albert, and Mansford, clearly proved the remedial and curative powers of galvanism in certain forms of disease. Since their time, many important discoveries have been made in the manner of dealing with this mysterious agent. As a therapeutic agent in diseases of the nerves, among which we may mention neuralgia, tetanus, tic-doloroux, facial paralysis, etc., it certainly has no equal. There are but few members of our specialty who have given the subject sufficient attention to inform themselves of the diseases to which electricity is especially applicable.

This apathy is inexcusable, particularly so in an age like the present, when improved and suitable instruments and batteries, are so easily obtained. Compact, portable batteries of sufficient power for all practical purposes are now made after the most simple plans, and no practitioner need be deterred from using them by a fear of intricate mechanism.

A new cautery battery has recently been devised by Dr. Byme, which is said to be far superior to those formerly used. Its advantages rest in the fact that the plates are less fragile, and the connections not liable to oxygenization. It is also more compact than those usually made.

The writer was he believes the first to introduce the cautry battery in oral surgery, and Prof. Brasseur, in a monograph recently read before a medical body at Amsterdam, called attention to this fact.

In the removal of diseased growth, the writer has proved the cautery a valuable acquirement to the resources of our specialty. Its particular advantages rest in the fact that the action is instantaneous, painless, and entirely without shock or hemorrhage, which in operations of the buccal cavity is of great importance, for of such a delicate nature are these operations in most instances, and the hemorrhage so profuse and difficult to control, when vessels which cannot be readily ligatured are severed, that they are attended with more or less danger and unpleasantness. Hence the cautery becomes invaluable. I would also invite attention to the use of the cautery battery in removing or treating alveolar abscess, cauterizing exposed nerves, and obtunding sensitive dentine, etc.

In November, 1876, I removed with the cautery a very large tumor from the mouth of a lady, the operation occupying but a brief space of time, while the patient experienced little or no pain. Those members of the medical profession, and our specialty, who were present expressed themselves much pleased with the operation, a detailed report of which appeared in several of the medical journals of that time.

Experience has convinced me that by the careful use of improved instruments in connection with electricity, oral surgery is relieved of many of its terrors and of all its dangers.

The efficacy of electricity as a therapeutic agent in cases of facial neuralgia, tic-douloroux, etc., where medicines have failed to accomplish the desired results, is conceded by the best medical authority. Dr. Seeler, of Paris, in his work entitled *Galvanization par Influence*, refers to many cures made through electricity.

Dr. Bouchard, also a Parisian, recommends the use of the battery for the cure of aching teeth. He states that the pain can be almost instantly arrested by the application of the positive pole of the battery against the painful member, and the negative pole to the antero-lateral region on the same side.

The object of this article is to impress upon the members of our specialty the importance of bestowing upon the subject of electricity more than passing attention, with a view to the accomplishment of greater results; for there is little doubt but that many of the diseases a dentist is called upon to treat may, by the employment of electricity, surgically and otherwise, be entirely eradicated.

"Upward and Onward" should be our motto, for who can say what great and valuable results may be the outgrowth of carefully conducted experiments in the direction suggested?

New York.

SUCCESS IN PRACTICE.

BY S. B. PALMER, M. D. S.

Doubtless every one on entering the profession desires and expects success. That there is a wide range in attainment of those long in practice no one will deny. I cannot but feel that much time is wasted in the effort to obtain correct methods of practice, and all for want of definite knowledge of the thing to be done.

Now there are two questions which we ought to be able to answer at the outset :

1st. What do we desire to do ?

2d. How shall we do it ?

The fact is more and more apparent that no one method of operating embraces all that is required to meet varying conditions. Time might be saved by conceding that diversity of gifts through different agencies often accomplish the same object. Take for instance filling teeth with gold. From first to last there has been continued discussion as to the form and application of this material. According to the transactions of the American Dental Association at its recent meeting in Boston, the end is not yet. These discussions it is true teach the various methods of manipulation, but they are not upon that basis that settles questions scientifically, therefore discussion is ever in order.

What are the facts : 1st. Gold properly manipulated will effectually preserve a large majority of teeth requiring fillings.

2d. Gold is recommended to us in various forms intended to meet the many requirements of teeth, skill and circumstances.

3d. Must we not admit that various methods and forms have been successful in the hands of Tucker, Arthur, Dwinell, and other champions of special adaptation.

The lesson we should draw from these facts is that operators differ in manipulation as men differ in handwriting and other acquirements which go to make individuality. Since there is good in all forms and methods, it becomes the duty of each to acquire sufficient knowledge of the whole to at least know which, under existing circumstances, will best meet the end in view. *Which is best* cannot be determined by discussion which only cover the methods of doing things while the *thing to be done* is not mentioned. The demand for a filling implies that a portion of the crown of the tooth is without enamel, or in other words is exposed to the chemical action of such agents as may then exist in the oral cavity. The agency of a filling in preventing such action consists in excluding the corroding fluids from the surface beneath the filling. Let us bear in mind that exclusion of fluids from the dentine is the thing to be done to make what is termed a successful filling. If we have a bottle containing ether or chloroform, we understand that it is essential that the stopper fit closely. It makes no difference what the stopper is made of so that there be no communication between the contents within and the air without. This principle applies well to filling teeth, with no matter what material. Of course there are many things to be taken into account—beauty, durability, cost, etc.,—all of which are essential, but do not relate to points under consideration.

Out of respect to the members who differ with the views denominated the *electro-chemical theory*, I wish to illustrate, or define my understanding from first-class practice. Perhaps at this time an explanation of one sentence relative to the action of gold upon dentine may save some from misconceptions, and I do not intend to provoke discussion upon any previously introduced theory. We have said that "gold is incompatible with teeth bone." After reading the various conclusions as reported in the journals I feel that my own understanding of the matter and its application to practice might be the best reason I could render at this time. Now let us commence far back, and for the time being say nothing of the poor who cannot have gold fillings, nothing of the poor teeth which cannot be saved by such fillings ; let us assume that dentists generally are skilled in the use of gold, and let us be liberal with all and say that ninety per cent. of teeth filled may be saved. This large percentage would apply only to the best operators, and the best class of patients. It is not unreasonable to suppose that circumstances might reduce the percentage to fifty or below. The vital question is—what is the real cause of failure? One says defective manipulation : another incompatibility. Discussions do not settle the question. Failures charged to malleting, to cohesive gold, to leaky fillings, all rest upon a level that any metal of a nature sufficiently fine to resist oxydation in the mouth, if continued in close contact with tooth structure, will by reason of thermal change and the aid of solid substance like meat fiber, nerves membrane, etc., decompose the fluid lying between the filling and the cavity walls. In other words, the success of a gold plug which does not exclude circulation of fluids is incompatible, because the tendency is to maintain an acid conditiion which works ruin in a short time.

Let this pass as a mere statement and return to the correction of the evil. The requirements are that the gold shall absolutely exclude moisture at the outer surface—as the cork fits the neck of the bottle. It matters little whether the center of the plug be dense or not ; it is of no account what form of gold is used. That is best which enables the operator to best attain the points necessary—namely, contact of gold with dentine.

To recapitulate: Gold is incompatible with teeth bone in connection with moisture. Perfect adaption excludes moisture and secures succes. Defective manipulation opens up the way for secondary decay upon well founded principles. Thus we believe that little good can come from strong persistence in the use of any one material, or mode of practice.

In connection with the law already mentioned, I feel prompted to call attention to the more recently introduced amalgam. Great effort is made to produce amalgam that will not tarnish. Considerable progress has already been made in this direction, and much of this material we are told is now being used. According to the principles already mentioned, we are to look for some disappointment respecting the use of fine amalgam in that class of teeth most in need of that material. The disappointment, if any, will consist in decay around the plug—progressing more rapidly than might have been looked for with the ordinary composition. This does not apply to the better class of teeth which might as well have been filled with gold, but in cases where there is need of some antisceptic agent to fill the porus dentine and which is usually furnished by the oxyd in the plug. There is much due to this agent for the preservation of broken down teeth. If the ordinary amalgam, when thoroughly crystalized, could be converted into gold, it would be greatly inferior to a plug of gold inserted in the ordinary way—it would lack the firm pressure against the walls necessarily obtained in packing. This defect is in part made up by the oxyd already mentioned. For this reason I apprehend the failures alluded to. There may be means devised to overcome any such difficulties, should they arise. In my practice I line the cavities of all doubtful teeth with tin foil, as I would for gold, using more tin however. I find the tin amalgamated, which presents to the dentine a soft plastic surface of material quite compatible with tooth bone, and not in the least injurious to the amalgam proper. The process of absorbing excess of mercury by packing tin foil upon the surface of the plug so changes the compound that the edges have no strength to resist attrition, and soon there appears a slight groove around the plug in contact with the walls of the cavity.

SYRACUSE, N. Y.

EXTINCT TOOTHED BIRDS.

Among the organic wonders of which from time to time during the past decade announcements have appeared, none have been received with more interest than the discovery of birds with teeth, made by Professor Marsh near the end of the year 1870, in the middle Cretaceous rocks, which in Kansas and Colorado spread out eastward from the base of the Rocky Mountains. So perfect a matrix do the peculiar buff, chalky, or marly beds of the Kansas middle Cretaceous formations furnish for the preservation of organic remains, that almost every bone of the skeletons of some of the birds has been recovered. The material for the study of their osteology is thus almost as ample as that for any living bird. Full advantage of this abundant store of material has been taken. The cases and cellars in the Peabody Museum at New Haven contain the remains of about fifty different individuals of a single bird. Every bone of its skeleton, with the exception of one or two terminal toe-bones and the extreme point of the tail, has been recovered, and is here carefully drawn of the natural size. Never before has it been possible, we believe, to reconstruct so perfectly so ancient an organism.

The volume is divided into two parts. In the first of these the detailed structure is given of the bird on which the author has bestowed the name of *Hesperornis.* The skeleton of this animal if extended to its full length would measure about six feet from the point of the bill to the end of the tail. It must have been a typical aquatic bird, without any power of flight, but with strongly developed limbs and a long, flexible neck, whereby it was doubtless endowed with remarkable powers of diving and swimming, and of seizing the abundant fishes of the shallow seas in which it lived. Compared with our modern birds, the two features of this ancient form which most forcibly arrest attention are the teeth and the legs. The teeth were covered with smooth enamel, terminating upward in conical pointed crowns and downward in stout fangs, closely resembling those of mosasauroid reptiles. Their mode of growth and replacement have been determined to have taken place in a manner very similar to that in some reptiles, the young tooth forming on the inner side of the fang of the tooth in use, and increasing in size, while a pit for its reception was gradually made by absorption. The old tooth, being progressively undermined, was finally expelled by its successor, the number of teeth thus remaining unchanged. The teeth were implanted in a common alveolar groove, as in *Ichthyosaurus*. In the upper jaw they were confined to the maxillary and entirely absent from the pre-maxillary bone ; in the lower jaw they extended from near the anterior extremity of the ramus along the entire upper border of the dentary bone. Mr.. Marsh believes that they were held in position by cartilage which permitted some fore-and-aft movement, but on the decay of which after death the teeth readily became displaced and fell out of the jaw. This is an important fact in its bearing upon the nature of the teeth found on the same slab of Solenhofen limestone with the well-known *Archæopteryx*. These teeth, it will be remembered, were referred by Mr. Evans to the bird itself—a reference fully confirmed by Mr. Marsh, who says that he at once identified the teeth as those of birds and not of fishes, and by the subsequent discovery of other remains of the bird. In *Hesperornis regalis* there appear to have been fourteen functional teeth in the maxillary bone, and thirty-three teeth in the corresponding ramus of the lower jaw. The wings are rudimentary or aborted, a remnant of the humerus alone existing. They may have gradually diminished from disuse until, as the power of flight ceased, the legs and feet increased in proportion, and assumed the massive dimensions shown in these specimens, or, as Mr. Marsh suggests, the bird may have been a carnivorous aquatic ostrich, never having possessed the power of flight, but descended from a reptilian ancestry, which is strongly recalled by different portions of the skeleton. Among recent birds, the peculiar legs and feet of *Hesperornis* find their nearest analogues in the Grebes of the genus *Podiceps*. They were admirably adapted for propulsion in water, but scarcely served for walking on land. Locomotion must have been entirely performed by the posterior limbs—a peculiarity which distinguishes *Hesperornis* from all other aquatic birds, recent or fossil. The tail appears to have been composed of twelve vertebræ, unique in their peculiar, widely-extended, transverse processes and depressed horizontal plowshare bone. Broad and flat, somewhat like that of the beaver, it must have been a powerful instrument in steering the bird through the water.

The second part is devoted to a description of the remains which have been found of birds belonging to a second order of Odontornithes, termed *Odontotormæ.* Unlike *Hesperornis*, they seem to have been all of comparatively small size and to have possessed powerful wings, but very small legs and feet. From that contemporaneous form, and from all other known birds recent and fossil, they are distinguished by certain types of structure which point back to a very lowly ancestry, lower even than the reptile. Their bones, being mostly air-filled, would enable the carcasses to float on water until, by decay or the rapacity of other animals, they were separated and dispersed. Hence skeletons of these flying birds are less entire than those of the massive-boned *Hesperornis.* Nevertheless, the remains of no fewer than seventy-seven different individuals have been disinterred. These are included in two well-marked genera, *Ichthyornis* and *Apatornis*, and were all small birds, reminding us by their strong wings and delicate legs and feet of the Terns, like which they were probably also aquatic in habit. Besides the reptilian skull and teeth, the birds of this second order were marked by the character of their vertebræ, which in their biconcave structure recall those of fishes. This is the more remarkable, as in *Hesperornis* the vertebræ are like those of modern birds. Yet these two utterly dissimilar types were contemporaries, and their remains have been preserved in the same strata. Mr. Marsh points out that the transition between the two vertebral types may be traced even in the skeleton of *Ichthyornis* itself, where the third cervical vertebra presents a modification in which the ordinary avian saddle-shaped form appears as it were in the act of development from the biconcave ichthyc form."—GEIKIE, in *Nature.*

THE ANTISPTIC TREATMENT OF ROOTS.

The attention of the profession having been of late greatly occupied in investigating the merits of antiseptic surgery, it may not be altogether unprofitable to consider how far the antiseptic principles are applicable to the teeth ; and, if applicable, what the practical result of their application will be.

With this view I have for the last year been employing two very powerful antiseptic agents in the treatment of dead roots, eucalyptus oil and iodoform, with very satisfactory results.

Eucalyptus oil and iodoform are both very much more powerful antiseptics than carbolic acid and their effects are much more permanent.

When a tooth dies, partially or wholly, the slough which remains differs in no respect from a slough in any other part of the body ; if it become septic, (as in the natural course of events it must), it will cause inflammation and suppuration, and be rejected from the living economy. Furthermore if these products of inflammation be prevented from discharging themselves through the open cavity, owing to presence of a filling they will collect inside and force their way up the fang, and end by causing an alveolar abscess. Now if a local slough in any other part of the body be rendered, and kept perfectly aseptic, the behaviour of the parts is very different, there is neither *irritation* nor *inflammation*, the dead tissue, remaining perfectly white, pure and sweet smelling is gradually removed by absorption, not rejected as discharge ; the temperature does not rise, there is no pus ; the slough is quietly absorbed and replaced by new, living, cicatricial, connective tissue. This result may be seen at any time in Professor Lister's hospital practice or any where else, where the antiseptic precautions are punctiliously observed.

If then this asepticity be produced in the pulp cavity of a necrosed tooth, that is if all the bacteria it contains be destroyed and the entrance of fresh ones prevented, then the slough it contains, whether it be part or all of the pulp may be sealed up with an impermeable filling, without fear of any of the unpleasant sequelæ above alluded to. The slough will be removed not by inflammation and suppuration, but by absorption and replacement by cicatricial tissue. There will be no abscess because there will be no inflammation, the dead pulp having been rendered inert.

From theory to turn to practise, the whole gist of the matter lies in the words *perfectly asceptic ;* antiseptics to be any use at all must be carefully and thoroughly applied.

The method of procedure I have adopted has been very simple, and hitherto invariably successful. It has simply consisted in clearing the cavity, removing a little of the slough from the pulp cavity, and dressing the tooth with eucalyptus oil and iodoform on a piece of wool every day (the patient can do this for himself if necessary), until no smell but that of eucalyptus oil can be detected when the dressing is removed. It may then be sealed up with gutta-percha, as an experiment (the encalyptus has a slight solvent action on gutta-percha, which renders the stopping very perfect). If it is perfectly aseptic, there will be no disturbance, and the tooth, after three weeks or so, may be permanently filled. If the asceptic condition is not perfect, the patient will soon experience unpleasant sensations, in which case, the gutta-percha must of course be taken out and the dressing resumed, and the gutta-percha tried again after another interval. Of course, all pus and debris should be removed first with an excavator.

The smell and taste of eucalyptus oil is rather pleasant, and it causes no irritation whatever to gum or lips, and this is no unimportant point to a patient who has to use the dressing for a long time, especially if he has had any previous experience of creasote.

Under these circumstances, if a pulp be partially dead, or if one root be dead and the other living, it is not necessary to destroy the living part with arsenic.

Lastly, in the case of an alveolar abscess, the effect of eucalyptus oil when injected, is more rapid and effectual than that of any other agent with which I am acquainted, because its antiseptic powers are not only greater, but *more permanent*, which latter is a very important point in regions where bacteria teem as they do in the mouth.

The power of iodoform to avert suppuration, has been much testified to recently in all the medical papers, and the rapidity with which I myself have seen chronic ulcers and soft chancres disappear under it, is almost magical. Eucalyptus oil dissolves iodoform, so that they can be easily used together.—UNDERWOOD, in *Monthly Review of Dental Surgery.*

THE PHARMACOPŒIA.

The National Convention for the Revision of the *Pharmacopœia* met in Washington, May 5th, 1880. It was generally conjectured, for reasons stated, that contributions would be very much more numerous than ever. Forty-five institutions, of which ten were pharmaceutical, were represented, but only nine of them submitted reports on revision. Of these, six were from pharmaceutical and three from medical organizations, namely, the American Pharmaceutical Convention, the Louisville College of Pharmacy, the Maryland College of Pharmacy, the National College of Pharmacy, D. C., the Philadelphia College of Pharmacy, the Pennsylvania Pharmaceutical Association, the Philadelphia County Medical Society, the College of Physicians of Philadelphia, and the National Medical College, D. C. These reports, which constitute the materials out of which a new *Pharmacopœia of the United States* is to be made, were referred to the Committee of Revision and Publication, as it is called, composed of twenty-five members, of whom four are from Boston, six from New York, five from Philadelphia, two from Washington, D. C.; and Kentucky, Maryland, Ohio, Missouri, North Carolina, the Marine Hospital Service, the Army and the Navy are represented each by one member. The thirty-five medical organizations present in the convention are represented in this committee by eleven, and the ten pharmaceutical bodies by fourteen members ; and the institutions of Boston and New York, which contributed nothing whatever to the work, are very much more largely represented than those organizations that furnished reports. Nevertheless, the elaborate character of the reports given to the committee, the qualifications of its members, the widespread interest taken in the work, and, possibly, the preponderance of pharmacists engaged in it, are reasonable grounds for the expectation that the *Pharmacopœia* of 1880 will excel any of its predecessors.

The National Convention for the Revision of the *Pharmacopœia* has held its sixth decennial session, and adjourned to meet again in Washington on the first Wednesday of May, 1890. Outside of the medical profession, it attracted very little attention. Except physicians and apothecaries, very few persons appreciate the value of the work done in two or three days once in ten years, or understand that it has an important influence on certain interests of society generally.

Probably no work of the same size published in the United States has bestowed upon its preparation as much careful attention as the *Pharmacopœia.* Including the primary labors of institutions and those of the final revision, the work is the joint production of between seventy and eighty qualified individuals, who give personal attention to all its details. The preliminary reports of colleges and societies upon which it is based are results of patient, scrutinizing investigations by committees composed of men reputed to be versed in the subject. Numerous and expensive pharmaceutical and chemical experiments are made to test and verify proposed methods of preparing compounds. In the past two years committees of colleges and societies have been zealously at work. Some of them have held more than seventy meetings, each occupying about two hours, during which they have critically considered the merits of every article admitted into the work. All the reports thus prepared will be again carefully examined and compared by the committee appointed by the convention to revise and publish the book. If it is not perfect when published, the imperfections may be fairly ascribed to lack of ability, but not to heedlessness of any of its authors in the execution of the task they have cheerfully assumed.

All this labor, which is performed by men who are dependent on their professional work for a livelihood, is gratuitous. If the many authors or compilers of it received even moderate compensation, the cost of preparation, added to the expense of printing, would be an obstacle to publication. It would necessarily render the price of the volume so high as to place it beyond the convenient reach of those for whose immediate use it is chiefly designed, and greatly tend to prevent a general distribution of the work among them. The gentlemen who engage in the cause freely give to it their time, experience, labor, and technical knowledge, and defray the expenses incident to the necessary investigations, as well as to attendance at the meeting of the National Convention. Consciousness of having contributed something to a public good, which is always satisfactory to a benevolent mind, is their only compensation.

The preparation of the *Pharmacopœia of the United States* is not the only example of the disinterested public spirit which characterizes the medical profession. Methods of preventing the occurrence of epidemics, of preventing the spread of disease, and sanitary measures for the preservation of health of communities, always originate among physicians, or are based on the medical sciences. No class of citizens contribute more to the welfare of the poor. Charities founded for the care of the indigent sick and hurt pay for all they need—buildings, furniture, food, medicines, instruments and appliances; but, as a rule, they do not pay for the professional services of physicians and surgeons. So freely do physicians give their services to hospitals, dispensaries, infirmaries, that thousands of mean persons who are not needy avail themselves of the opportunities which such institutions afford to sponge upon the profession. The evil has become so great that physicians in all large communities are endeavoring to devise suitable measures for the protection of their pecuniary interests in this connection, without excluding from their bounty any whose condition entitles him to pity and charitable ministration.—RUSCHENBERGER, in *Stoddart's Review.*

AQUA FORTIS.

Dr. Atkinson said that in his opinion the censors who had inflicted the reading of this paper, [" Oral Electricity and the New Departure," by Dr. J. J. R. Patrick,] upon the American Dental Association, needed to go to school. It was abominable for a man who claimed to know something of natural philosophy, to go on with the wretched drivel, misconception and misstatement the association had just listened to. Whoever the miserable wretch was who had written the paper was of the old fogy stamp, and had hidden under a mass of words, a little information that could have been given in two minutes. He said that the idea that fifty or sixty parts of the mercury contained in an amalgam filling could be absorbed into the system to its injury was absurd; for the mercury could do no harm until it entered into some new chemical combination.

Prof. Buckingham objected to Dr. Atkinson's method of discussing this paper, and contended that the paper was worthy of discussion.

He held that electricity may exist in the mouth, but whether it was the cause or the product of decay was yet undetermined. The working of a battery is not easily explained, and probably not one man in a thousand comprehends it in its simplest form. Electricity resulting from the incompatibility of metals with tooth substance, is a question of difficult solution, and an attempt at its discussion should not be met as this paper has been met here.

Dr. Atkinson claimed that we ought to discriminate between the things that we fancy and the things that we know. What he objected to was not the study of science, but that incompetent men should attempt such investigations and bring their crudities before this body. He had a right to speak of the paper as he had done.—*Proceedings of American Dental Association.*

HEVEENOID—THE RUBBER OF THE FUTURE.

We condense the following from a pamphlet written by Prof. Henry A. Mott, Jr., and published by Trow's Printing and Bookbinding Company, of 201–203 East 12th street, New York :

Heveenoid is the name of a new product which is destined to supplant the soft and hard vualcanized India rubber which has for so long a time supplied the market. The base of Heveenoid is India rubber, whence the name, from *heeven,* the name given by the natives of South America to the milky juice of the India rubber tree ; and *oid,* a Greek termination signifying *like.* The combination of this base with camphor vulcanized by sulphur constitutes *Heveenoid.* The discovery of Goodyear and Day, that sulphur will vulcanize India rubber, first made this substance of value in the industrial arts. While this discovery must always be looked upon as one of great value, the discovery of the new product, Heveenoid, by Henry Gerner, opens a new era in the rubber industry, and will, unquestionably, to a very great extent, in time, take the place of the vulcanized rubber of to-day.

The proportions of the constituents to make a soft and hard Heveenoid may be approximately given as follows :

	Soft Heveenoid.	*Hard Heveenoid.*
Rubber	2 parts.	3 parts.
Camphor.	2 "	2 "
Lime.	1-16 "	——
Glycerine	——	½ "
Sulphur	½ "	8 "

Para is best for hard Heveenoid, while Nicaragua rubber answers very well for soft Heveenoid, and, in fact, is somewhat more adapted.

It is a well known fact that sulphur will only combine to a very limited extent with rubber, only about one to three per cent. entering into chemical combination, the remainder of the sulphur added existing only in mechanical suspension. This fact is proved by two simple experiments—*first*, one or two per cent. of sulphur is sufficient to vulcanize with, and produce the change ; and *second*, if vulcanized rubber is ignited, instead of burning with a steady, smoky flame, it throws off sparks of ignited sulphur, and if the flame be extinguished, the sulphur will be seen to solidify. The odor also of sulphurous acid is very marked. This is not the case with Heveenoid ; all the constituents of this new product are chemically united. The sulphur unites with the camphor, forming a sulphide of camphene, which either dissolves or is dissolved by the rubber ; it seems, however, more probable that the former is the case.

The temperature at which the constituents unite chemically is just above the melting point of camphor. In the manufacture of ordinary rubber, if too much sulphur is added the product is hard and brittle. If such rubber be placed and left sufficiently long in molten camphor, it swells up, and combines with the camphor, acquiring toughness and flexibility, and becomes a desirable material ; in other words, it becomes Heveenoid.

The process of manufacturing Heveenoid, is, of course, patented, the patent being held by the Heveenoid Manufacturing Co., of New York. At Hoboken, N. J., works are erected sufficiently large to make over three thousand pounds of stock a day. This Company, however, only manufactures specialties, and sells licenses to other companies. The great consideration in favor of Heveenoid is the fact that it can be manufactured, and put on the market for about thirty to fifty per cent. cheaper than the ordinary vulcanized rubber.

The properties of good vulcanized rubber are: Elasticity, pliability, durability, insolubility, unalterability by climate, or artificial heat or cold, inadhesiveness, impearmeability to air, gases, and liquids, odor, plasticity, facility of receiving every style of printing, facility of being ornamented by painting, bronzing, gilding, japanning, and mixing with colors, non-electric quality, spreading quality.

A thorough investigation into the merits of Heveenoid, which I have had occasion to make, developed the fact that Heveenoid not only possesses the above mentioned properties of vulcanized India rubber, but in many instances possesses them in an infinitely superior degree. As for example, Heveenoid is far more pliable, durable, and insoluble than ordinary India rubber. Being a chemical combination is less impermeable to air, gases and liquids. As regards odor, it is far superior to vulcanized rubber, which, as is well known, possesses a very disagreeable, sulphur odor. Soft Heveenoid smells of camphor, which renders it of great service as a moth and insect destroyer. Its application for lining of closets or wrapping of furs, etc., as also for submarine cables opens a large field for it. Hard Heveenoid, when rubbed or when warm, has a slight odor of camphor, but is not noticed unless under these conditions—the odor being pleasant, is much to be preferred to the old sulphur odor. Heveenoid possesses a great value over rubber in the manufacture of jewelry, as the sulphur, being in chemical combination, permits of the use of poor as well as fine gold in ornamenting it. None but eighteen carat gold can be used with the ordinary vulcanized rubber, otherwise, owing to the free sulphur in its composition, the gold would change color. As regards coloring, Heveenoid, is far superior to rubber, as it may be colored any desired tint. This is something which the manufacturers of rubber have often attempted to do, but have utterly failed.

Another property Heveenoid possesses is the facility with which it can be sawed and designed. A saw may be used with Heveenoid for from one-half to three-quarters of a day without being sharpened. The sharpening of saws in the working of ordinary vulcanized India rubber is a matter of great expense, as they must be sharpened about every half hour. It is the friction of the saws against the uncombined sulphur in India rubber which dulls them; the sulphur in Heveenoid being in chemical combination, can offer no such frictional resistance.

The discovery of Heveenoid will certainly give rubber and camphor a much wider application in the arts, as this new product is adapted for many new purposes, where ordinary India rubber would be useless. It seems strange that the combination of gum camphor with rubber had not been thought of before, especially when the fact is considered that Goodyear obtained his first patent in 1844, nearly forty years ago. The only way it can be accounted for is the fact that the India rubber business has been a monopoly, and like most monopolies, original investigation in the line of improvements have been prosecuted only to a limited extent. The merits of Heveenoid are such as to indicate an exceptionably profitable future, both as a benefit to the industrial arts and as a business of itself.

MEDICINE IN ANCIENT EGYPT.

The physicians were compelled to prescribe for their patients according to rules set down in the standard works. If they adopted a treatment of their own, and the patient did not recover, they were put to death. Thus even in desperate cases heroic remedies could not be tried, and experiment, the first condition of discovery was disallowed. * * * * * *

Even these books [in the library at Thebes], so few in number, were not open to all the members of the learned class. They were the manuals of the various departments or professions, and each profession stood apart; each profession was even sub-divided within itself. In medicine and surgery there were no general practioners. There were oculists, aurists, dentists, doctors of the head, doctors of the stomach, etc., and each was forbidden to invade the territory of his colleagues. This specialist arrangement has been highly praised, but it has nothing in common with that which has arisen in modern times.

It is one of the first axioms of medical science that no one is competent to treat the diseases of a single organ unless he is competent to treat the diseases of the whole frame. The folly of dividing diseases of such organs as the head and stomach, between which the most intimate sympathy exists, is evident to the unlearned. But the whole structure is united by delicate white threads, and innumerable pipes of blood. It is scarcely possible for any complaint to influence one part alone. The Egyptian, however, was marked off, like a chess board, into little squares, and whenever the pain made a move a fresh doctor had to be called in.—Reade, in *Martyrdom of Man.*

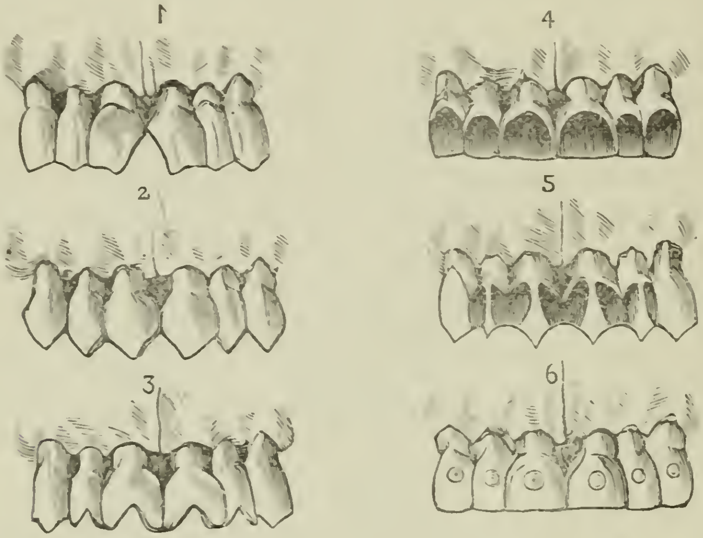
TOOTH STRUCTURE ILLUSTRATED.

Mr. Geo. E. Fell, of Buffalo, N. Y., gave a description of a series of plates illustrating the structure of the human teeth. In explanation the speaker said these plates constituted a series of enlarged sectional drawings cut transversely, exhibiting the structure, microscopic and general, of a human molar tooth. The average size of the sectional views is about six inches square, beginning with a view of the grinding surface or top view of the crown of the tooth, and successively introducing the structure and conformation of the enamel, cementum, dentine, and pulp cavity, up to the fangs of the tooth as located in the alveolar portion of the superior maxillary bone. The exhibitor gave a very interesting description of the structure of the teeth, aided by the plates, which were marvels of ingenuity and neatness, being constructed of sheets of paper overlapping one another, colored to nature, and so constructed that the various sections could be unfolded and each successive layer of the interior structure of the tooth consecutively exhibited.

Mr. Fell stated that the drawings were prepared from a series of sections of human teeth made by himself sufficiently well to make out the structure with the microscope. His object in preparing them was to afford the medical and dental student another aid to the study of the structure of the human tooth. For the purpose of locating the sections he had prepared a modified copy (side view) of the tooth of Dr. F. G. Lemercier, of Paris, upon which the sections were represented by a series of transverse lines.—*Proceedings of American Society of Microscopists.*

FASHION IN DEFORMITY.

The teeth, although allowed by the greater part of the world to retain their natural beauty and usefulness of form, still offer a field for artificial alterations according to fashion, which has been made use of principally in two distinct regions of the world and by two distinct races. It is, of course, only the front teeth, and mainly the upper incisors, that are available for this purpose. Among various tribes of negroes of Equatorial Africa, different fashions of modifying the natural form of these teeth prevail, specimens of which may be found in any large collection of crania of these people. One of the simplest consists of chipping and filing away a large triangular piece from the lower and inner edge of each of the central incisors, so that a gap is produced in the middle of the row in front (1). Another fashion is to shape all the incisors into sharp points, by chipping off the corners, giving a very formidable crocodilian appearance to the jaws (2); and another is to file out either a single or a double notch in the cutting edge of each tooth, producing a serrated border to the whole series (3).



Upper Front Teeth altered according to Fashion: Malay.

The Malays, however, excel the Africans, both in the universality and in the fantastic variety of their supposed improvements upon nature. While the natural whiteness of the surface of these organs is always admired by us, and by most people, the Malays take the greatest pains to stain their teeth black, which they consider greatly adds to their beauty. White teeth are looked upon with perfect disgust by the Dyaks of the neighborhood of Sarawak. In addition to staining the teeth, filing the surface in some way or other is almost always resorted to. The nearly universal custom in Java is to remove the enamel from the front surface of the incisors, and often the canine teeth, hollowing out the surface, sometimes, but not often, so deeply as to penetrate the pulp cavity (4). The cutting edges are also worn down to a level line with pumice-stone. Another, and less common, though more elaborate fashion, is to point the teeth, and file out notches from the anterior surface of each side of the upper part of the crown, so as to leave a lozenge-shaped piece of enamel untouched ; as this receives the black stain less strongly than the parts from which the surface is removed, an ornamental pattern is produced (5). In Borneo a still more elaborate process is adopted ; the front surface of each of the teeth is drilled near the center with a small round hole, and into this a plug of brass with a round or star-shaped knob is fixed (6). This is always kept bright and polished by the action of the lip over it, and is supposed to give a highly attractive appearance when the teeth are displayed.

Perhaps the strange custom, so frequently adopted by the natives of Australia, and of many islands of the Pacific, of knocking out one or more of the front teeth, might be mentioned here, but it is usually associated with some other idea than ornament or even mere fashion. In the former case it constitutes part of the rites by which the youth are initiated into manhood, and in the Sandwich Islands it is performed as a propitiatory sacrifice to the spirits of the dead.

The projection forward of the front upper teeth, which we think unbecoming, is admired by some races, and among the negro women of Senegal it is increased by artificial means employed in childhood. —FLOWER, in *Popular Science Monthly.*

RAPID BREATHING IN RELIEF OF PAIN.

Dr. Bonwill, a Philadelphia dentist, in a paper read at the Philadelphia Medical Society (Philadelphia *Medical Times*, July 17th), stated that in dental and other operations not requiring more than twenty or thirty seconds he had found that persons could be rendered insensible to acute pain by rapid breathing, carried as far as 100 respirations in the minute, consciousness and general sensibility remaining intact. The patient feels every touch, and in order to be exempt from pain the inspirations must be kept up vigorously during the whole operation without stopping for an instant. It is difficult for a person to respire more than 100 times in a minute in consequence of the exhaustion produced, and for a minute after the end of the process he cannot breathe more than once or twice; and very few can raise hand or foot. During the last four years Dr. Bonwill, by employing this plan in dentistry, has been able to do without any anæsthetic; and in major operations, less of an anæsthetic is required when rapid breathing has first been employed, the after effects also being much less unpleasant. It is also a highly useful plan in labor. The New York *Medical Record* (August 21st), observes that a perusal of the papers and discussions on this subject leads to the conclusion that there may be something of practical value in Dr. Bonwill's discovery. It seems that anæsthesia to a greater or less extent can be obtained by it; but its practical usefulness is not so well established. A good many failures have occurred, but the method is so simple that there ought to be no trouble in determining its exact value. The most favorable position for the patient is lying down on the side, and it is generally best to throw a handkerchief over the face so as to prevent his attention from being distracted. He should then be directed to breathe at the rate of about 100 respirations in the minute. The directions best given is to "blow out in rapid, puffing expirations." At the end of from two to five minutes, the patient continuing his rapid breathing all the while, teeth may be drawn or incisions made, and there will generally be an entire or partial absence of pain, which will last thirty seconds or more. According to Drs. Garretson, Hewson and Kite, it takes from one-half to three-fourths less of the liquid anæsthetics to produce insensibility when their administration has been preceded by rapid breathing.—*Medical Times and Gazette.*

ODDS AND ENDS.

India-rubber is subject to two kinds of deterioration and decay. In one instance it tends to become soft, and loses its elasticity, while in the other it becomes friable, yellowish, and resinous in its nature. The last mentioned kind of deterioration has been clearly and indubitably traced to an oxidation of the caoutchouc. This oxidation is tolerably rapid when the caoutchouc exists in a finely divided state, and when it is exposed to damp at the same time ; but the alternate damping and drying of the caoutchouc tends more toward its rapid oxidation than does a continual state of dampness. The resinous matter resulting from the oxidation of caoutchouc has been carefully studied by Spiller, who found that a sample of felt, originally composed of cotton fibers and India-rubber, had become so far changed during six years as to contain no trace of caoutchouc ; but in its place he found a resinous substance resembling rhellac. The conditions under which the softening of the India-rubber takes place are not so well understood, but there is some reason to believe that this is due to incipient oxidation. Ozone oxidizes caoutchouc with extreme rapidity, and the action of ozone on vulcanized India-rubber is similar to its action on the unvulcanized material.—Bolas, in *Popular Science Monthly*.

Mixing Amalgam in Sulphuric Acid.—In using amalgam, the first thing we ought to take into consideration, is whether that which we are using and calling by that name is such ; and I venture to say that in a very large number of cases it is no amalgam at all, but a concrete admixture of solid metals with liquid mercury. In the early days, when metallic precipitate of silver was employed, perfect amalgamation was not difficult to obtain, provided the precipitate had been in the first instance properly washed and carefully stoppered, the minute subdivision of the metal and absence of oxydation aiding largely in this result. The fillings of the present day are of a totally different character—coarse in grain, and of a nature to oxydize on even momentary contact with air; they become difficult to amalgamate with mercury, which, in itself, is a highly oxydizable metal, so that recourse is often had to a glass tube and violent agitation, to produce that which is at best only a semblance of what it should be—a thoroughly homogeneous mass, that upon settling will retain a uniform texture and density proportionate to the constituents of which the fillings are composed. If, however, to the filings and mercury be added a drop or less of sulphuric acid, either in the palm of the hand or mortar, it will be found that the metals will almost instantaneously amalgamate, whilst the oxydes combining with the acid leave a residuum which, by its quantity, clearly shows what a very imperfect body could have been a so-called amalgam containing only a small portion of them. Washing in pure water at once removes all trace of acid, and a thoroughly reliable stopping can be at once produced from materials otherwise worse than useless.—CUNNINGHAM, in *Reprint* in *Missouri Dental Journal.*

TEMPERATURE OF THE BREATH.—Mr. R. E. Dudgeon has been trying some experiments on the temperature of the breath, and infers from the results that it is considerably higher than has generally been stated, and that it is variable. First, on rising in the morning, having ascertained the temperature of his body as shown by the thermometer in the axilla and mouth to be normal—about 98½°—he wrapped the thermometer tightly in a silk handkerchief and breathed upon it. In five minutes it indicated 106.2. At 7 P. M., after a brief walking exercise, and when he had eaten nothing but a spoonful of boiled rice, and drunk only half a glass of water and a mouthful of ginger-beer, his breath raised the mercury to 107°. Immediately after a dinner at which only water was drunk, a temperature of 108° was shown. At other times the thermometer would not rise, under apparently the same conditions, higher than 102° to 105°. He can suggest no way of accounting for these indications otherwise than by admitting that they show the actual temperature of the breath as it issues from the lungs. "If so," says Mr. Dudgeon, "it is by the breath that the system gets rid of its superflous caloric." The experiments seem to show that the temperature obtained from the breath is higher when the surrounding air is warm than when it is cold, indicating possibly that more heat is passed off by the breath when less can escape from the general surface of the body.—*Popular Science Monthly.*

CONDUCTORIAL.

SOMETHINGS MICROSCOPICAL.

At the December meeting of the Rochester Microsopical Society, Mr. Henry C. Main, one of the society's most active members, exhibited some of his recently constructed test plates, each plate containing twenty-one diatoms skillfully arranged in a straight line from left to right, and in the order of the difficulties encountered in attempts at resolution. Their value may be inferred from the statement of an American microscopist whose name is synonimous with diatoms, that they equal in every respect and excel in several the justly celebrated test plates of Möller. One diatom in particular, *Amphipleura pellucida,* excited considerable interest and comment, both on account of its extremely fine markings and the close proximity of its only known *habitat* Lake Ontario. The corresponding diatom of Möller's test plates is an exceedingly coarse affair, and may be easily resolved a dozen times while the observer is "drawing a bead" on this but once. As yet nothing is known of Mr. Main's plans for putting these plates on sale. It may, however, be enough to know that those familiar with his work are urging him to place them where they will do his brother diatomists and himself most good.

Major William Streeter exhibited one of Ernst Gundlach's latest and best objectives, an homogeneous oil-immersion one-eighth, the angular aperture of which was 140°, though the objective was marked 138°. It gave a perfectly flat field, had good working distance, and resolved the above named diatom beautifully and with ease. He said this was the objective that had been mentioned by a Boston expert, in a printed and widely circulated letter, as comparing favorably with his Zeiss one-twelfth, the only Zeiss objective with which it could be legitimately compared. It is now owned by the exhibitor, whose pride in its ownership is, to say the least, pardonable.

The same gentleman also exhibited a new fine adjustment for microscope stands, invented and manufactured by Messrs. Yawman & Erbe, of this city. What are commonly called fine adjustments rarely get beyond one hundred threads to the inch, but this—a differential screw, which is "a compound screw by which a motion is produced equal to the difference of the motions of the component screws"—gives a movement equal to three hundred and sixty threads to the inch. This exceedingly fine movement may be reduced, by loosening a conveniently placed milled-head screw, to sixty threads to the inch, an adjustment sufficiently fine for all low power objectives. This fine adjustment is attached to all stands made by this firm, and may at slight expense be attached to stands of other manufacture. All microscope stands made by Messrs. Yawman & Erbe have three adjustments: 1st. The rack and pinion common to all good instruments; 2d, The ordinary fine adjustment as used on first-class instruments generally; and 3d, What may be called their *superfine* adjustment, the differential screw. It was on a stand fitted with this superfine adjustment that Major Streeter was enabled to "show off" his highly-prized one-eighth objective, which he did under most unfavorable circumstances, resolving and re-resolving the *Amphipleura pellucida* of Mr. Main's test-plate, a feat that with the ordinary fine adjustment had often consumed fifteen minutes in its accomplishment.

A GOOD SEND OFF.

The *Missouri Dental Journal* speaks of us in this wise:

ODONTOGRAPHIC JOURNAL.—Among the late additions to our periodical literature is the ODONTOGRAPHIC JOURNAL, a handsome quarterly, conducted by J. Edw. Line, D. D. S., and published by Davis & Leyden, Rochester. N. Y. The third number has been recently received, and we find its contents of a very useful and interesting character. Journals like this serve to cultivate a taste for scientific reading, and its favorable reception indicates an increased appreciation of this class of magazine matter.

NEWS.

In the article "Hippotamus," which may be found at the close of Vol. XI, of the Enyclopædia Brittanica, the reader is treated to the following choice bit of information, which is "news" indeed :

> Still more valuable are the tusks and incisor teeth, which, from their extreme hardness and the fact that they do not readily become yellow, are now largely used in the manufacture of artificial teeth.

ORAL SURGERY.

Dentists who buy books and read them will be pleased to hear that Garretson's *System of Oral Surgery* has reached its third edition, and is now in press. We understand that the author has worked long and hard on the forthcoming volume, a guarantee that it will prove superior in every respect to its predecessors.

REMOVAL.

Dr. F. E. Howard has removed to Buffalo, where he will have entire charge of Dr. G. C. Daboll's office and practice. In his removal from this district the 7th Society loses one of its most active and valuable members. We congratulate the 8th Society on this accession to its membership.

BY TELEGRAPH.

Under date of December 1st, we received the following dispatch :

Supreme Court has affirmed Judge Shipley's decision. Use of celluloid no infringement of Cummings' rubber patent.

CELLULOID MANUFACTURING CO.

Just as we go to press the mail brings the full text of the opinion of the Supreme Court affirming the above decision. Copies may be had of the Celluloid Manufacturing Company.

AN ASSISTANT.

Any responsible dentist in want of an assistant of fifteen years experience, first-class in every respect, should address "D. D. S.," P. O. Box 171, Alfred Centre, Allegheney county, N. Y.

HYMENIAL.

SWOPE–PERINE.—Married in New York, on Thursday, November 11th, 1880, Mr. Benedict W. Swope and Miss Evalyne Perine, daughter of Dr. and Mrs. Geo. H. Perine. The ceremony was performed at St. Ignatius' church.

A VIOLENT CASE OF UNIVERSAL GENIUS.

MR. EDITOR : While going the rounds of some of our backwoods recently, I ran across a member of the "profession" who knows and does all manner of things—repairs watches, mends jewelry, trades horses, sells dental stock, paints wagons, pulls teeth, keeps a bowling alley, makes sets, does job printing, runs a saloon and presents his picture (a chromo) to his lady patrons. What shall we do with him? What *can* we do?

FRITZ.

Such genius should not go unrewarded. Let him alone!

BIBLIOGRAPHICAL.

TRANSACTIONS OF THE NEW YORK ODONTOLOGICAL SOCIETY, 1879, Philadelphia. Sam'l S. White, 1880.

We are glad of the growing importance of the Odontological Society, whose influence has long been conspicuous wherever dentistry is practised. It is well that its regular contributions to *Cosmos* are thus annually embodied by themselves. These books form a sort of convenient miscellany of the general and special topics covered by the papers and discussions of the society.

We suppose that the inquiries of the Odontological Society during the last ten years have either touched upon or explored most, if not all of that which chiefly concerns modern dentistry; and that any diligent reader who has surveyed the ground covered by the transactions of the society, must have been at pains to make a special index for his own use of the various subjects it has debated. For although each yearly volume has a table of contents, those indices hardly suggest, except in the most general way, what we suspect many readers could wish, when driven by some emergency, had been more particular. If the society would consent to publish the indices of all the preceding volumes, each with its appropriate date, in each new volume, that would facilitate the exploring a subject without unnecessary handling of the books.

But we hope to see the day when the Odontological Society shall do better than that—when it shall seriously undertake sifting, analyzing and summarizing its transactions, and putting them into form as an *Hand-Book of Dentistry*. Probably such a work would grow to the proportions of a cyclopædia in time.

X.

FILINGS.

DENTAL students at Philadelphia are brushing up their Latin, some of them having got as far as —*hic*.

I SAY, dentist, that tooth hurt, and as I've got to go down town now you can draw the other while I'm out.

THE Society of American Taxidermists, recently organized in this city, is believed to be the first of its kind ever established. Its avowed object is to combine the skill and knowledge of taxidermists in the development of their art, and to raise it to a level with the kindred fine arts of painting and sculpture. It has just closed its eight days exhibition.

A WASHINGTON paper has the following:

No. 67. The Goodyear Dental Vulcanite Co., appellant, vs. Charles G. Davis. Argument commenced by Mr. Henry Clifford for appellant and continued by Mr. Henry Baldwin, Jr., for appellee. Adjourned until to day at 12 o'clock.

AND a later issue this:

THE decision of the Supreme Court of the United States, in the case of the Goodyear Dental Vulcanite Co., appellant, vs. Charles G. Davis, published yesterday, settles a question which has been the subject of much litigation. The opinion decides that the use of celluloid for dental plates is not an infringement of the Cummings patent and therefore, the appellant can collect no royalty or license for its use.

THE minister asked the Sunday-school, "With what remarkable weapon did Sampson at one time slay a number of Philistines?" For awhile there was no answer, and the minister, to assist the children a little, began tapping his jaw with the tip of his finger, at the same time saying: "What's this, what's this?" Quick as thought a little fellow quite innocently replied: "The jaw bone of an ass, sir."

HERE is a specimen of a "card" issued at Salisbury at the close of the past century: "John Hopkins, parish clerk and undertaker, sells epitaphs of all sorts and prices. Shaves neat and plays the bassoon. Teeth drawn and the Salisbury *Journal* read gratis every Sunday morning at 8. A school for psalmody every Thursday evening, when my son, born blind, will play on the fiddle. Specimen epitaph on my wife:

> "'My wife ten years, not much to my ease,
> But now she is dead *in coelo quies*."

Great variety to be seen within. Your humble servant John Hopkins."

THE

ODONTOGRAPHIC JOURNAL.

CONDUCTED BY J. EDW. LINE, D. D. S.

VOLUME II.

April, July, October, January.

ROCHESTER, N. Y.:
DAVIS & LEYDEN,
91 & 93 STATE STREET.
1882.

CONTENTS OF VOLUME II.

ORIGINAL COMMUNICATIONS.

PAGE.
Biology—Its Limitation.—H. T. Hickok 1
The Cat and its Relations—Frederic A. Lucas 33
Prospective Annual Address 65
Histology and Microscopy of Secondary Dentine—I. C. Curtis, M. D. S. 69
Preservation of Teeth by Filling—S. B. Palmer, M. D. S. 97
Review of "Unfortunate Interfernce" in Ohio State Journal of Dental Science, August, 1881—By one of the few 103
The Legal Status of New York—W. C. Barrett, M. D., D. D. S. 105

SELECTIONS.

Anomalies—Temporary Enlargement of the Parotid Gland 14
Filling Root Canals 16
The Advantages of Ignorance 18
Transplanting and Re-Implanting Teeth 19
The Best Food for Children 21
Opaque Patches in the Mouths of Glass Blowers 22
Preliminary Studentship 23
Buchanan and Bogus Diplomas 24
Operative and Prosthetic Dentistry 45
Iodoform 49
Book Physiology Abroad 50
When Men are at Their Best 51
The Demonstration of Tissue Elements 52
Analgesia by Rapid Breathing 53
Dangers of Dentistry 54
Anatomy, Physiology and Surgery 71
How Science Tortures Humanity 78
Syphilitic Alterations of the Teeth 79
Abernethy on Table Hygiene 80
The Human Fosile of Schipka Cave 81
How Syphilis is Communicated 81
The Chances of the Doctor 84
Section on Diseases of the Teeth 84

Peculiar People.... 87
Remedial Education.... 88
A New Gaseous Disinfectant.... 89
Cannibal Scotchmen.... 90
From Cartilege to to Bone as seen by the Microscope.... 90
Sensitive Dentine.... 92
Chemistry and Materia Medica.... 111
Amateur Investigation.... 115

CONDUCTORIAL.

Local Dental Society Meetings.... 25
Coming Dental Meetings.... 27
Honors.... 28
Wisconsin Dental College.... 55
Society Meetings.... 58
A Suggestion.... 59
Off for Europe.... 60
Necrological.... 60
Ohio College of Dental Surgery.... 61
The New Journal.... 64
The Bogus College.... 92
Corrections.... 93
To Whom it May Concern.... 95
Experiments with Nitrous Oxide and Carbonic Acid.... 119
Squibs.... 29, 60, 93, 120
Correspondence.... 30, 61
Books, Pamphlets, Periodicals.... 30, 62, 94, 123
Filings.... 32, 64, 96, 124

NECROLOGICAL.

Samuel S. White, D. D. S.... 28
Lansing B. Cook, D. D. S.... 60
Prof. E. Lloyd Howard, M. D.... 120

THE

ODONTOGRAPHIC JOURNAL.

VOLUME II.—*April*, 1881.—No. 1.

BIOLOGY—ITS LIMITATION.

BY H. T. HICKOK.

Read before the Rochester Society of Natural Sciences, Dec. 21st, 1880,

The human body is composed of two parts: a hard part or formed matter, as the bones, nails, teeth and hair, and a soft part, as muscle, nerve and fatty matter. The hard parts are secreted from the softer and these are formed from the blood. The blood is made up essentially of two parts; minute particles of matter called cells, and a fluid in which the cells float. The food which we eat is converted by the mouth, stomach, liver and other organs into these blood cells which are taken to every part of the body through the arteries, and there deposited.

THE HUMAN BODY AN AGGREGATE OF CELLS.

The body is thus composed of multitudes of minute cells which under various modifications are known as nerve, muscle, bone etc.

But, however complex the organization of the animal may be, the nerve cells, and other cells are the result of growth from one primitive cell, namely: the egg from which the body was developed.

These are well-known facts, and they apply to all the higher forms of animals, and as far as may be to all animal life.

PLANTS, LIKE ANIMALS, AN AGGREGATE OF CELLS.

The tree, and all the other flowering plants, as well as nearly every specimen of vegetable life have their analogies with animals more or less strongly marked, in regard to food, digestion, circulation and growth. The tree is composed of cells which are in every essential particular like the blood cells of animals: These cells are formed from the food which the tree takes in at its leaves and roots, and which are carried by the sap to every part forming woody fibre. The softer parts become converted into the harder parts or bark which corresponds to the dead matter in the bodies of living animals. The tissues of complex plants, like those of complex animals, are the results of multiplication and growth from one simple seed or spore.

EVERY LIVING THING A CELL OR AGGREGATE OF CELLS.

The man, and then the tree, as well as nearly all animals and plants, are an aggregate of cells which may be traced to a simple egg or seed. I say *nearly* all animals and plants, since some living creatures of which I shall hereafter speak, are so simple that they have no organs whatever. The simplest form of these primitive creatures is by no means an aggregate of cells—it is only a speck of plastic matter. It is in no essential particular different from the egg or seed or blood cell, except that it leads an independent life; feeding, living, growing and multiplying, while the egg and the seed, from which complex creatures are formed, cannot continue to feed and grow and multiply without building up around them complex organisms, the life of whose separate cells depends on the integrity of the organism as a whole.

We might not inaptly call the egg and blood cells gregarious cells, and these independent plastic specks, solitary cells.

WHAT IS ESSENTIAL IN THE EGG AND SEED.

If we are not already familiar with this field of inquiry, it may be well to administer a caution against forming a wrong conception of the true nature of the egg or seed.

The real egg and the real seed are mere specks of germinal matter· usually very small, as is the case with most animals, and the seed and spores of most plants.

The so called shell and white of eggs, and the bulky part of most seeds are not an essential part of their life.

A patient study of the ovarian egg and other cells, has enabled embryologists to make a clear distinction between what is essential and what is not essential in them, to the reproduction of life.

The cell of an egg is composed of an outer envelope, inclosing some plastic matter, and within this last is a minute portion or nucleus. These three parts were, at one time, supposed to be essential parts of the cell. But it was shown by Nægali, Alex. Braun and Max Schultze, between the years 1846 and 1861, that the investing membrane is not an essential part of the cell. Still later Brucke, Kuhne and others showed that the nucleus is not an essential part of the cell.

THE UNITY OF ALL GERMINAL MATTER.

The egg, therefore, the seed, the white blood cell, the plastic speck which constitutes the entire body of the simple structures to which I have already referred, are primitive cells, and are composed of a mass of matter homogeneous in structure, and without parts or organs of any kind whatsoever. *

A SUB-KINGDOM OF CREATURES OF DOUBTFUL AFFINITY.

After the invention of the microscope, scientists became rapidly acquainted with very low forms of life, which, within the last twenty years have attracted great attention. Many of these low forms possess characters of such doubtful affinity, that biologists could not refer them with certainty to either of the sub-kingdoms of animals or plants. Professor Haeckel, who has given special attention to the study of these forms, placed them provisionally in a group by themselves and called them. Protista. He divided the Protista into ten groups, the lowest of which he named monera. The monera he divided into species to which has been added a very interesting species found by Professor Huxley in the deep waters of the Atlantic, and named by him Bathybius Haeckelii. This moneron is Homogeneous in structure and destitute of all organs. The food with which it accidentally comes in contact in its environment works its way into the interior of the plastic mass and is assimilated into the matter of the living organism.

---

* This statement is made on the authority of Haeckel—"History of Creation" Vol. 1, P. 184. Lionel Beale—" Life, Matter and Mind," P, 14. Rickert—"Histology," P. 30. Sir John Lubbock—"Origin and Metam or phoses of Insects," and is confirmed by the writings of Bastian, Huxley and others. I take occasion to cite these authorities as it will not escape the reader that so eminent a writer as Dr. Porter, President of Yale College, in a work entitled, "The Human Intellect," has squarely contradicted this statement. He says, P. 29, organized * * * beings are heterogenious, *i. e.*, they are made up of parts which are unlike in structure, form and function. Even of organized beings, the lowest form are divided into parts called organs, to each of which is assigned some function or operation which is shared by no other, and which is essential to the existence of the whole and to the action of each of the parts."

Animals, plants and these Protista constitute all living things. The conception of the close relationship of the most complex and the simplest forms of these groups is the result of that close questioning of nature so strongly characteristic of the present century.

THE DIVIDING LINES IN NATURE IMAGINARY.

Before men began to observe sharply, and reason critically, every animal was supposed to be an animal, and every plant, a plant. Every group was supposed to be cut sharply off from every other group. There were supposed to be sharp lines dividing animals from plants, and living things from not-living things, and mind from matter. But these lines of separation have been growing more shadowy with every succeeding year, until timid men have begun to grasp nervously after their shadowy extension as if all nature must fall to pieces if any of these lines were lost. Every discovery of facts in nature is forcing men to ask with increased emphasis, "Are there any such lines?" "Does not nature, after all, shade off from the ghostly ether that fills interstellar space into the highly complex phenomena called mind?"

That there are living things in distinction from not-living things, and that there is living matter in destinction from dead matter, must be held to be true, so long as those terms stand for well defined phenomena of matter. But, is there any point along the line of organization of matter against which, on the one side, lie the well defined phenomena we call life, and against which, on the other, are the well defined characters of dead matter? In other words, is there any exact beginning of life, and are the higher phenomena of mind one with the ordinary phenomena of organized matter? The limitations of Biological science are to be determined in accordance with the answers which shall be finally given to these questions.

THE RECOGNIZED LIMITS OF BIOLOGY.

It is already admitted that Biology, in its ideal development, would treat of the structure and functions of all living creatures individually and in their successive development, and of the interaction of structure on function, and function on structure. In other words, systematic Biology would require us to account for the phenomena of Embryology, Morphology and Physiology of animals and plants, and the functions of the Protista. Would it also, let us ask, require us to show how life comes from not-living matter, and would it require us to deal with the phenomena of psychology?

THE EXACT LIMITS OF ALL PHYSICAL SCIENCE INDETERMINATE.

The boundaries of Biological science like those of every other physical science, are constantly shifting. Its recognized limits of to-day may not be its limits for to-morrow. As Geology shades off into Astronomy and Cosmology because there are, in the nature of the case, no exact limits; so we must admit that Biology would shade off into Chemistry, if it could be shown that there is no "vital force" peculiar to living matter. It would also appropriate the entire domain of Psychology, if it could be shown that mental phenomena are only ordinary phenomena of matter.

PROOF OF VITAL FORCE WHERE SOUGHT.

Is there then a "vital force" peculiar to living matter?

A solution of this question has been sought in a study of very low forms of living creatures. For more than two centuries a sharp contest was waged over the doctrine of spontaneous generation; it was believed that experiments on the lowest forms of life, would furnish a solution of the questions in dispute. It was thought, that if low forms of life sprang into being without the contagious influence of an antecedent germ, the doctrine of a vital force not acting under ordinary law, would fall to the ground; and it was as strongly believed that experiments with decoctions of animal and vegetable matter would furnish positive results.

SPONTANEOUS GENERATION AN OLD BELIEF.

From the time of Aristotle till about the middle of the seventeenth century, it was the easy and natural belief that many of the lower animals, such as shell fish and maggots of flies, were generated directly out of the substances by which they were surrounded.

The year 1668 is memorable as being the year in which doubt began to gather around this old belief, inaugurating a controversy which has been pursued along an unvarying line for more than two hundred years. In that year Francis Redi discovered that the larvæ of a certain fly that had been believed to be spontaneously generated was produced from eggs.

From that time onward, for three-fourths of a century, animals were more carefully studied, and many species that had been believed to be spontaneously generated, were found to have sprung from eggs.

THE DOCTRINE OF SPONTANEOUS GENERATION ABANDONED.

These discoveries wrought such a change of opinion, that by the middle of the last century, the theory of spontaneous generation seems to have been abandoned by naturalists. Through the researches of Carl Ernst Von Baer, which were concluded in 1827, it was shown that the larger animals of the four great sub-kingdoms were produced from eggs.

Later, between the years 1850 and 1858, Siebold and Leuckart showed that other species of animals, such as cysticerci and Trichina spiralis that were thought to have been spontaneously generated, because they were found encysted in the solid tissues of other animals, were produced from eggs.

Between 1668 when this controversy began, and 1850 many experiments were made by Needham, and others tending to prove that, after all, *some* animals are spontaneously generated ; and by Spallanzani, Schultze, Schwann, and others, whose experiments seemed to be conlusive against the doctrine.

In 1850, however, the controversy was renewed by Pouchet, who claimed that experiments of his own had confirmed those of Needham. Numerous investigators, prominent among whom was Paster, made many careful experiments, with results the opposite of those reached by Pouchet. This left the facts again in dispute.

Between 1850 and 1875 the controversy was sharply pursued with skillful experimenters arrayed on each side, prominent among whom was Dr. Bastian. He exposed flasks containing infusions of animal and vegetable matter which were swarming with Bacteria and other low forms of life to a temperature so high that by the admission of his opponents all life must have been destroyed if there were no defects in the experiments, or if there were no conditions favorable to the preservation of life which could not readily be detected. But on cooling the flasks and opening them, living forms were found in some of them. These experiments seemed quite conclusive.

BACTERIA NOT SPONTANEOUSLY GENERATED.

In 1875, however, Prof. Tyndall conducted a series of experiments which established, beyond a reasonable doubt, the fact that Bacteria are not spontaneously generated, but that they are produced from germs or spores that are floating in the air. He also proved that these germs are so small that they cannot be seen with the most powerful microscope now in use, even while thousands of them are in the field of the glass. His paper detailing these experiments, was read before the Royal Society of London, July 13th, 1876, and is of the utmost value to science. They may be said to form an epoch in the history of the doctrine of spontaneous generation.

Further experimenting in this direction would seem to be useless. All living things, from the most complex to the simplest forms, seem from the stand-point of observation, to come from eggs or seeds or germs ; and some of the lowest forms, from germs so minute as to be hopelessly beyond the reach of the most powerful glasses.

The moneron, though it does not come from the so-called egg, comes apparently from antecedent life. The parent separates into two or more parts, and each part becomes a new and independent being, growing till it reaches the parent size.

ALL OBSERVED LIFE FROM ANTECEDENT LIFE.

A point has been reached where all biologists, (except, perhaps a few who regard the experiments of Bastian and his co-workers as conclusive, and who, therefore, believe that Bacteria and other low forms of life are produced directly from inorganic matter, without the medium of egg or germ) agree that all life, so far as it comes under direct observation is derived from antecedent life.

It is further admitted that this "antecedent life" comes, in the final analysis, from the inorganic elements themselves.

DEBATABLE GROUND REGARDING LIFE.

But here the ranks of thoughtful and scholarly men are divided, the extreme evolutionists claiming that the simplest living particles of matter have come directly from the most complex organic particles, or else directly from the elements in accordance with ordinary mechanical and chemical laws, while the other class, of whom Dr. Beale is a leading representative, claims that there is a vital force entirely different from any known force which converts inorganic matter into living matter. They regard life as the cause, and not as the product of organization.

THE FIELD OF THE DISCUSSION CHANGED.

The field of inquiry then, in regard to the origin of living beings, has bean transferred from highly organized animals and plants, to the simple structureless cell without cell, wall or nucleus. We no longer ask for the origin of life in a man, but we simply ask, where do .the simple germs from which he has grown up obtained their life.

It has also been transferred from the line of direct experiment with animal and vegetable infusions to a consideration of the recognized phenomena of living matter in their relation to establish physical and chemical laws.

THE PHENOMENA OF LIVING MATTER.

Let us inquire then, what are the phenomena of living matter? In general, the living mass feeds, grows, re-produces itself in its offspring, and has a sort of spontaneous movement. Not-living matter exhibits phenomena that are in some respects analogous to these, and yet, a general familiarity with living things forces upon the observer the conviction that the manifestations of living matter are widely separated from any phenomena observed in not-living matter whether it be organic or inorganic.

GROWTH IN LIVING AND DEAD MATTER COMPARED.

The crystal feeds in one sense, and grows, but how? The nucleus gather around itself from the outside, particles of matter like itself in size, form, and chemical composition, but the growth is only accretion, while living matter seizes upon matter, organic or inorganic, as the facts may be, which is entirely unlike itself, and conveys it into the interior of its own mass by contractile movements of itself, and there assimilates it into matter of its own kind.

The increase of its mass by assimilation constitutes its growth. Its re-production consists in the breaking up of its own substance into two or more parts, each of which is one of its offspring.

Its spontaneous movements are a sort of contractile process producting locomotion, and other phenomena that impress the observer in a wonderful degree with the feeling that its subject matter is strangely unlike all other matter.

OTHER PHENOMENA IN LIVING MATTER.

Beside these phenomena we find in living matter a stronger tendency to assume a spherical form than exists in not-living matter, a stronger tendency to decompose and a mobility or plasticity that contrasts strongly with not-living matter.

If science shall at any time be able to show that these and other admitted phenomena of living matter are necessary results of complex combinations of the elements of matter under ordinary physical and chemical laws, the doctrine of a "special vital force" will fall to the ground, the line dividing living and not-living matter will disappear; the doctrine of spontaneous generation, which many believe to have been finally disproved by the experiments of Prof. Tyndall, already referred to, will be established by a new line of proof, and Biology will shade off into chemistry.

SCIENTISTS STILL BELIEVE IN SPONTANEOUS GENERATION.

It may be safely said that those scientists who have most strongly denied the conclusiveness of Bastian's experiments believe, nevertheless in the spontaneous production of living things. But they regard the doctrine as a necessary inference from the doctrine of evolution in general. They regard the solution of the principal phenomena of living matter already strongly foreshadowed. Let us here inquire to what extent.

PLASTICITY OF LIVING MATTER.

It is a notable fact that but five or six elementary substances are chiefly concerned in the formation of organic substances. Carbon, oxygen, hydrogen, nitrogen, phosphorus and sulphur form a sort of organic family group, and the organic substances which they form are widely convertible into each other without the aid of other elements.

Most of these elements are capable of existing under different molecular arrangements by which their properties are to some extent changed, while the atoms of which they are composed remain the same. Thus oxygen gives us ozone; carbon gives us graphite, coal and diamond. Their binary compounds also show the tendencies in a marked degree. It will be noticed again, that their binary compounds are less mobile than their elements, but more mobile than binary compounds in general. The distinguished chemist, Prof. Frankland, has given it as his opinion that protein which is a highly complex union of these elements may exist under a thousand isomeric forms, *i. e.*, without a change of its elements, it may undergo molecular changes, such as to make it represent a thousand different substances.

UNLIKENESS OF THE ELEMENTS OF GERMINAL MATTER.

Nitrogen, which acts a leading part in organic changes, is characterized by its chemical indifference. Oxygen is chemically active. Carbon shows the most extraordinary chemical adhesion. Hydrogen is the extreme opposite of Carbon, in the adhesion of its molecules, while sulphur and phosphorus, on account of their atomic arrangements are capable, it is believed, by their interference in organic compounds of greatly multiplying the number of their isomeric forms.

Hydrogen, Carbon, and Nitrogen have affinities that are low and comparatively narrow, while Oxygen has affinities that are exceedingly strong and wide. It is suggested that forces falling on substances so widely dissimilar can readily segregate them, and throw them into an equilibrium like that of germinal matter, more stable than their elements, and in general, more and more stable with the increasing complezity of the mass.

A plastic substance like albumen, may be regarded as the most natural condition arising from very mobile and dissimilar elements, which show a greater immobility with every increased degree of complex arrangements.

SPHERICITY OF LIVING MATTER.

It is observable that specks of germinal matter commonly assume a form approximating a sphere. If the life force is only ordinary physical force, why does not this germinal matter fall into crystaline forms?

Bearing on this point, it has been suggested that at least a partial explanation may be found in the well-known mechanical forces.

" A sphere* is the figure of equilibrium which many aggregate of units tends to assume under the influence of simple mutual attractions. When the number of its units are small and their mutual polarities are decided, this proclivity toward spherical grouping will be overcome by the tendency toward some special form, determined by their mutual polarities. But it is manifest that in proportion as an aggregate becomes larger, the effects of simple mutual attraction must become relatively greater, and so must tend to mark this effect of polar attraction. There will consequently be apt to result in highly complex units, like those organic ones containing nine hundred elementary atoms such approximation to the spherical form as must involve a less distinct polarity than in similar atoms."

EASY DECOMPOSITION OF LIVING MATTER.

It has been suggested further that the tendency of germinal matter to decompose is not at variance with certain well-known mechanical laws.

Inertia and gravity increase as the cubes of their like dimensions, while cohesion increases as their squares. The self-sustaining power of a body would become relatively smaller as its bulk became larger.

Let there be two masses of matter, one inorganic, two units in diameter, composed of a certain number of molecules ; the other organic three units in diameter, and composed of a much larger number of molecules.

---

*Spencer's Biology, Vol. I.

The inertia of the first would be represented by 8 (the cube of 2) and its cohesion by 4 (the square of 2.) Now let a force fall on it barely sufficient to move it bodily. This force is not therefore communicated to the molecules, and they do not move. Let the same force fall on the organic mass whose inertia is relatively greater or 27 (the cube of 3.) while its cohesion is relatively smaller or 9 (the square of 3.) The force is not sufficient to overcome the inertia represented by 27—it can only overcome an inertia of 8. Its momentum is therefore communicated to the *molecules* of the organic mass whose cohesion is 9. The force therefore, lacks but a single unit of decomposing the body.

COMPLEX COMPOUNDS ARTIFICALLY PRODUCED.

The advocates of a special vital force claim that no substance possessing an organized structure, such as wood fibre or muscular fibre, and "no absolutely indispensible organic constituent of animal or vegetable forms" has yet been artificially procured.

This their opponents admit, but point to the fact that chemists have built up in their laboratories many complex forms that were formerly thought to be the necessary products of "a vital force." These forms have generally been obtained from binary compounds, one of whose elements is present in several equivalents, by substituting for one of these equivalents an equivalent of some other element. Thus, from ammonia there has been obtained methylamine by replacing an atom of hydrogen by an atom of methyl, and from this last dimethyl-amine has been obtained by replacing another atom of hydrogen by one of methyl.

In a similar manner with acetic acid there have been built up propionic acid then butyric acid, and from this butyrate of dimethylamine.

CONTRACTILE MOVEMENTS OF GERMINAL MATTER.

The peculiar contractile movements of germinal matter has, perhaps, more than anything else impressed observers with the feeling that we have here phenomena that separate the living from the not-living world by a chasm that cannot be spanned. An explanation of these peculiar contractile movements of germinal matter, as well as other vital phenomena, has been sought among ordinary forces. The oldest reference to this subject was by Weber, who found that the movement of cilia could be accelerated by warmth. Kuhne found that the motions of amoebae could be arrested by chilling the containing fluid, and that their movements re-commenced on restoring the temperature. It seems more than probable that mechanical irritations, and electrical and chemical influences effect, if they do not entirely control, these contractile movements of germinal matter.

NUTRITION A CHEMICAL PROCESS.

The question of nutrition is simply the question of the power of a body to seize upon another and change its properties so that the new properties of the captured body shall be like its own. But the science of chemistry is built up of cases nearly like this. A given substance, organic or inorganic, seizes on some foreign body, changing the properties of the body seized and its own at the same time. It is not thought necessary, in order to account for this entire change of properties in both substances to invoke some new force, and there seems to be no greater mystery involved in the fact that while germinal matter changes the properties of its food, it nevertheless leaves its own properties unchanged.

RE-PRODUCTION BY DIVISION.

There seems to be nothing in the realm of not-living matter closely analogous to the process of re-production.

It is, however, a necessary consequence of nutrition and growth. Re-production in its simplest form, of which all others are modifications, is a breaking up of the parent into two or more equal parts.

New individuals, whether living or not-living, can be produced only in two ways ; by a multiplication of simple units, or by a division of a mass. Living things are produced by the last method. If they were produced by the first, each individual would be a new creation.

It is this method of generation by division, coupled with ever increased complexity of structure, that makes the law of evolution possible, and it is because all living forms seem to have been evolved from a single form, or a few simple forms that, among other things, forces upon us the conviction that germinal matter is not now being formed *de novo.*

THE SIMPLEST LIVING MATTER HIGHLY COMPLEX.

However simple a form may be, it is more than probable that we see in it a creature whose molecular structure it has required ages to elaborate.

That germinal matter is forming under present cosmical conditions seems improbable partly from the fact that the cosmical conditions may be supposed to have been more favorable to their production, when the cooling earth was falling through those temperatures at which the higher organic compounds are unstable, partly because the production of germinal matter eludes the chemist, but chiefly from the fact that the characters and functions of the low forms of life are exceedingly persistent. We find many low forms that have existed through several geological ages with little or no change.

The conclusion seems to be forced upon us, either that the law of evolution is not universal, which is contrary to known facts; or that the foundation of germinal matter is going on under present cosmical conditions, which we have seen is improbable; or that slow but important molecular and functional changes have been taking place in germinal matter preparatory to a subsequent more rapid evolution of form.

REVIEW OF THE ARGUMENTS.

We have thus far seen that, in considering this question of living matter, we have not to go beyond the simple cell or moneron. We have seen that this moneron is only a speck of plastic matter or albumen, composed of just such elements as are found every where in nature, in substances that are not organic. We have also seen that some of the substances lying along the pathway between the elementary substances and true germinal matter can be formed one from another in the laboratory; thus showing at least that they are not built up by the introduction of any extraordinary forces. We have seen that some, if not all, of their contractile movements, are the result of the ordinary forces falling on them.

We have seen, too, that their mobility is what we might expect from the dissimilar nature of the elements that compose them, and that sphericity and easy tendency to decompose seem to depend on mechanical and chemical laws, also that nutrition and growth do not require us to call in any peculiar force to explain their phenomena.

THE SUM OF VITAL PHENOMENA IS LIFE.

In thus running along down the line of inquiry from highly complex animals and plants, toward the elements of compound bodies, we see that the presumptions are strong, that there is no peculiar "vital force" and no exact point where life begins; that living matter is formed by the piling of atom on atom until the arrangement produces phenomena so well marked, that they arrest our attention and we give them a name, calling the sum of the phenomena "life."

BIOLOGY SHADES DOWNWARD INTO CHEMISTRY.

In view of all the facts it would seem that the demands of Biology will not be satisfied till it can stand squarely on the four elements out of which the framework of the great temple of living things is built up.

BIOLOGY SHADES UPWARD INTO PSYCHOLOGY.

And what is the other limit of Biology? As we go upward along man's so-called physical development, we reach another mysterious limit—the phenomena of mind. If life is a peculiar "vital force," Biology cannot, on the one hand go below the germinal cell as we have attempted to show. If mind is a miraculous product, and not the higher unfolding of ordinary matter, Biology cannot, on the other hand, go above man shorn of his intellectual faculties. But if mind is only a bundle of phenomena of highly complex physical organization, Biology would carry us through the phenomena of Pyschology and interpret to us consciousness which is incomparably the mystery of the universe.

ANOMALIES.

TEMPORARY ENLARGEMENT OF PAROTID GLAND,

A lady called to have a tooth filled temporarily, and to engage a sitting for some day later in the week. We filled the tooth—a left upper molar—with gutta percha, and then set a day for the performance of the permanent operation. She came according to appointment. When seated in the operating chair, our attention was called to the fact, that immediately after leaving the office a few days before, her face on that side corresponding with the affected tooth felt considerably swollen, and not a little painful. She thought it "might have been caused by handling, you know." To this observation we made no reply, but proceeded with the preparation of the cavity. In a short time we touched a particularly sensitive place and—up went both hands with an "Oh, my!" We looked. Sure enough, there was the swelling previously complained of. In a few moments it subsided, but only to recur on the slightest irritation of the dentine. We contrived to finish the operation, however, to the satisfaction of all concerned, the drawbacks being some suffering on the lady's part, and loss of time on ours.

To be brief, the facts in the case were these: The swelling was below and back of the ear, and more or less painful; it showed itself immediately after the application of an irritant to the dentine, but only while the mouth was distended inordinately, and yet not too much so for the successful performance of the operation in question; and lastly, while the mouth was in this wide-open condition no saliva passed the duct. Our theory was that the swelling was simply an enlargement of the parotid gland; that such enlargement was due to the secretion of a great quantity of saliva; that the duct which under other circumstances would have carried the saliva off, was subject to temporary obstruction; and that such obstruction was to be found in the tissues adjacent to the duct of Steno, and which compressed the duct only while the mouth was in the condition above described.

TWO CASES OF TRANSPOSITION.

Following are illustrations of two cases of transposition; canine and bicuspid teeth—a comparatively rare form of irregularity. Figure 1, is a male; figure 2, female. In the first case the irregularity is of no consequence, either as to the person's appearance or convenience. In the other case, however, the bicuspid gives the left side of the mouth an angular look that borders on deformity.

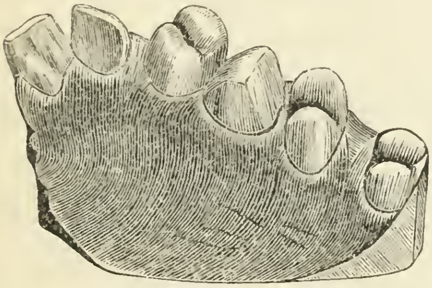


Fig. 1.

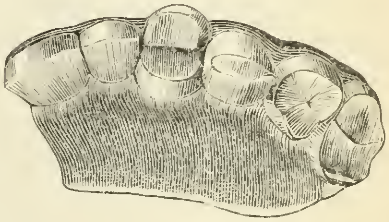


Fig. 2.

The following extracts contain the substance of the literature of this form of irregularity:

Salter says: "It is confined, when complete, to the upper canine tooth, which may occupy a position between the bicuspid teeth, * * or it may separate the central from the lateral incisor."

Wedl says: "Sometimes the canine tooth abandons its proper place entirely, and is found by the side of the central incisor, in which case the lateral incisor is located either upon the lingual or lateral side of the displaced canine tooth."

In a note on the same page, Dr. T. B. Hitchcock says: "The museum of Harvard Dental School contains a cast taken from the mouth of a young woman, in which the left inferior lateral incisor and canine are transposed, the canine being turned so that its labial surface is presented towards the central incisor and the median line, while its lingual surface is presented towards the lateral incisor and backwards."

Tomes illustrates "a case in which the canine is placed between the central and lateral incisor. Sometimes the canine will be found between the bicuspid teeth. * * * The position of the canine of the upper jaw is, during the period of development, so much above the adjoining teeth that any irregularity in the growth of the neighboring parts of the alveolar ridge, or of its contents, may throw it either in front of the lateral or behind the first bicuspid tooth. Even the position of the developing cusp of the canine itself may lead to a similar result. If, for instance, the point be directed either fowards or backwards, the tooth in its decent many lose the proper position, and come either between the incisors or the first and second bicuspids."

FILLING ROOT CANALS.

It was my fortune to fill the first root canal that, so far as I know, was filled west of the Mississippi river, and probably west of the Alleghanies. At any rate, in the year 1849, I introduced the practice of filling root canals into the city of St. Louis. Some of the then leading dentists in the city pronounced the operation an impossible one, and declared that no such thing had ever been done, and that the claim that it had been done by any one was a pretence, intended to deceive, and designed to attract public attention with a view of gaining patronage. It was not long, however, before a series of successful operations compelled a recognition of its genuineness, and subsequently, of its utility. In assemblies like this I often hear remarks made about root filling, and reference made to drilling. In the thirty years in which I have practiced root filling, I have no idea I have introduced a drill into a root thirty times. I considered it, in a majority of cases, impracticable, and in almost all cases worse than useless, because harmful. It is so uncertain what course the drill will take; it is so difficult to follow the line of the canal with a drill, and there are so many objections to its use that I should resort to it with a great deal of hesitation. The reason that I don't do it is that I do not find it necessary.

Ordinarily I fill a root canal in five minutes; sometimes it takes a less and sometimes a longer time. I have tried a great many methods of filling. The method I first practiced was that of introducing gold foil in small squares with delicate instruments, carrying them up one by one. Afterward, and for many years, I introduced gold foil wound upon a broach. Latterly the use of gutta percha and other plastic materials has been introduced. I have tried everything that has been recommended and have gone back to the gold method, with a small, but important addition; and that is this: Into a solution of shellac and alcohol, so thick that it will barely move when you tip the bottle, I dip the point of the broach with the gold mounting upon it. This is carried up with the gold, and, as the results of observations I have subsequently made, I find it very perfectly closes the canal in almost all cases. Have used shellac in this manner about two years. A solution of gutta percha may be used in the same way. If you have secured the closing of the foramen at the end of the root you have accomplished your work. It is a small matter to fill the rest of the canal. The essential thing is to prevent the entrance of fluids into the empty canal, through the foramen. The question has been raised whether there was not some infiltration through the dentine into the canal after the foraman is closed; but I am satisfied there is none, at least none that will do any harm. I have made a great many examinations, and never could find any; therefore I conclude if the foraman is closed the operation is safe.

Drilling is, to my mind, one of the most effectual means of defeating that very object. If you drill too far you do harm; if you do not drill far enough you defeat the object of the drilling. You should carry the gold mounting upon the broach up to the termination of the canal proper; the foraman is beyond that—that is the part to seal with the shellac paste.

After introducing the first gold mounting, withdraw the broach, allowing the filling to project into the pulp chamber so that you can see it and manipulate it. A whalebone probe, sharpened and worked down fine enough to enter the root canal readily, should be passed down beside the piece of gold already introduced, to condense it laterally and drive it forward at the same time. I can almost say I have had no trouble with root filling in that way. I consider it one of the safest operations we perform in dentistry. We have a great variety of forms of root canals. We have those that have wings on each side and a central portion larger in diameter. If you succeed in closing the foramen you have done your work. I do not pay any attention to the wings. If I can close the foramen I am satisfied.

If the diameter of the canal is sufficient to receive the filling to the entire end, I should fill it as far as I could go. Roots that are too small to be filled do not require any filling. If there is no opening through which sipage into the canal can occur, no harm can follow, and very minute root canals are closed by the coagulation of the albuminous contents of the canal itself. We see thousands of cases where the root canals are entirely empty. They remain in that condition a long time.—SPALDING, in *Proceedings of St. Louis Dental Society.*

THE ADVANTAGES OF IGNORANCE.

In every walk of life, in all professions, a similar superiority (of ignorance over wisdom) is daily manifest. At the polls, the trained and intelligent statesman is defeated by the loud-mouthed stump-speaker, who knows nothing of jurisprudence, less of political economy, and only enough of finance to be able to draw and spend his salary with commendable regularity. The broadly educated, highly cultivated theologian is surpassed in popular esteem by the swaggering revivalist, who tears up human feelings by the roots as a child pulls up sprouting beans for growing the wrong way. In medicine, the quack has five times the patronage of the well-informed physcian, and makes a fat living where the latter would only starve. Sick people are fond of liberal treatment, and like to be thought worse off than they really are. You have a slight cold, and a good doctor charges five dollars for curing you. But the brilliant empiric calls it congestion of the lungs, diphtheria, or pneumonia, visits you twice as often, and charges three times as much, and you feel that you have got a great deal more for your money. Your own ignorance chimes in with his, and both are better satisfied. Your stomach-ache is magnified in to gastric fever; your boil becomes an incipient cancer; a slight chill indicates approaching typhoid. The quack flatters your self-love, exalts your own importance in exaggerating that of your disease, comforts you with a good, sympathetic scare, and depletes your veins and your pockets with admirable equanimity.

The old saying that "fools rush in where angels fear to tread" affords another argument in behalf of the fool. To be sure, the natural history of the angel species has been but imperfectly studied; yet here again our very ignorance helps us. Theoretically, we should all like to be angels; but, practically, we prefer to stay where we are. Besides, familiarity with angels might be exceedingly uncomfortable; especially if they should take it into the ghosts of their late heads to visit us in spook-fashion, with the accompaniments of blue-fire and winding-sheets. But to the point again. Education makes men cautious and calculating; careful of precedents; afraid of mistakes. Many a time the brilliant audacity of a daring ignoramus has achieved successes which would have been unattainable to orderly skill and training. Lord Timothy Dexter, that most inspired of idiots, sent a cargo of warming-pans to the West Indies. The natives took the bottoms for sugar-scoops and the perforated lids for strainers, and Dexter gained a fortune out of his ridiculous venture. Zachary Taylor, whipped by a Mexican army, was too bad a soldier to be conscious of his defeat, and kept on fighting. His adversaries, astonished at his perseverance, thought he must have hidden reserves, and incontinently ran away. Thus Taylor won the battle, as cotemporaries say, "by sheer pluck and awkwardness." "Against stupidity the gods themselves fight powerless." Stupidity, therefore, by all the rules of logic, must be superior to sense, and truly deserves, over all competitors, the crown of laurel.—CLARKE, in *Popular Science Monthly*.

TRANSPLANTING AND RE-IMPLANTING TEETH.

At a recent meeting of the New York Odontological Society, Dr. E. A. Bogue, read the following communication from Dr. W. N. Morrison, of St. Louis, Mo.,

In response to the request for my experience in the re-implantation of teeth, I will answer your questions in the order written.

My personal experience in the operations of transplanting and re-implanting teeth extends over a period of sixteen years. In that time I have performed re-implantation about three hundred times, and transplantation twice.

All have proved successful with two or three exceptions, where there was great destruction of the process. It must be said, however, that the permanence of this success cannot be assured, as from slight accidental, or other disturbance, the teeth are likely to drop off without their roots at anytime.

I have tried many ways of performing the operation. My custom is to extract the tooth as carefully as I can, doing the least possible injury to the hard and soft parts. When the gum has been unusually adherent I have used the lancet with good results. This use has been only occasional, however, and I have observed no difference in those cases in the period of recovery, nor have I observed any increase or decrease of suffering consequent upon the use of the lancet; that depends upon the condition of the patient.

Amputation of the root or roots is not generally performed. The apical extremities of the roots are not generally roughened, but where they are, or where they have an abrupt crook at the point, I trim them off and make them into good shape.

In *rare instances* I find calcareous accretions upon the roots of extracted teeth, where no fistula or abcess having an opening into the mouth have ever existed.

The conditions that call for re-implantation are just such conditions as ordinarily cause us to extract and throw away teeth. I hardly ever have any cases of re-implantation in which any other operation or mode of treatment would answer the same end. The advantage hoped for in deciding upon re-implantation, in any case, would be a good tooth in place of a bad one.

In cases of failure, I do not know the cause; but such teeth are ever subject to the laws which govern deciduous teeth,—liable to be removed by absorption at any time. I have not perceived any peculiar diathesis as generally existing in those cases,—scrofulous, hemorrhagic, or tuberculous,—nor has nutrition been deficient or faulty.

Some of my cases were for those occupying the highest social positions, others lower; but most of the cases were for women and girls in the Good Shepherd Convent,—maids-of-all-works. They were equally successful.

The teeth that have been re-implanted rarely have a recurrence of abscess, but stand unnaturally firm in their sockets, unless, or until, attacked by the odontoclasts. I have never had occasion to treat any a second time.

When re-implantation has been practiced for tartar and extensive loosening of the teeth, I have not observed that the gums become re-attached to those portions of the root that were denuded, and there is never a re-development of alveolus.

I invariably fill the pulp chambers and canals before re-implanting. I do not regard the establishment of a fistula or other means of drainage as either necessary or desirable. I believe in doing the work thoroughly and neatly; nature will then do the remainder quite up to our standard of perfection.

I continue to replant, and will transplant when I can find suitable cases. Though sixty per cent. may be failures, I have had one, two, or half a dozen cases that I would not have missed for any reasonable consideration, and the patients are repaid for their pain and trouble two-fold. Try it upon just such patients as will not give you time to treat abcessed teeth, or who live out of town and cannot come regularly. You get a tooth just ready for the filling, and the patient does not come back for a month. Everything is then out of order. We used to extract such teeth and throw them away. Just replant a few, and if everything goes favorably, you will have some successful enough to make you want to see more.

THE BEST FOOD FOR CHILDREN.

The appearance of the eye-teeth (cuspids) and lesser molars marks the end of the second year as the period when healthy children may be gradually accustomed to semi-fluid vegetable substances. Till then, milk should form their only sustenance. As a substitute for the nourishment of their mother's breast, cow's milk, mixed with a little water and sugar, is far superior to all patent paps, Liebig's compounds and baby soups, which often induce a malignant attack of the dysenteric complaint known as "bowel fever" "or weaning brash," unless palliated by still more condemnable astringents and soothing syrups. In France the professional wet nurses of the Pays de Vaud are generally engaged as *nourrices de deux ans;* but mothers whose employment does not interfere with their inclination in this respect may safely nurse their children for a much longer period. The wives of the sturdy Argyll peasants rarely wean a bairn before its claim is disputed by the next youngster; and the stoutest urchin of five years I ever saw was the son of a poor Servian widow, who still took him to her breast like a baby. Animals suckle their young till they are able to digest the unmodified solid food of the species; and the best method with weanlings, therefore, is perhaps that of the Ionian Islanders, whose toddling infants as Dr. Bodenstedt noticed, partake of the simple repast of their parents—unleavened maize cakes and dried figs—and are often permitted to exercise their teeth on a fresh-plucked ear of sugar corn. But, in countries where the repast of parents is anything but simple, the best food for young children is a porridge of milk and boiled rice or oat meal, with a little sugar, or a few spoonfuls of apple butter in summer time. Of such simple dishes a child may be permitted to eat its fill, but they should be served at regular intervals and never be taken hot. Heating our food is one of the many devices for disguising its natural taste, and sipping hot and cold drinks, turn about, is far more injurious to the teeth than the *penchant* for the sweetmeats which children share with savages and monkeys. Beginning with five light meals a day, the number may be gradually reduced to three, after which a system of fixed hours should be strictly observed, till the symptoms of appetite manifest a corresponding periodicity, thus saving mother's the trouble of providing baby titbits at all possible and impossible hours of the day. Healthy children at five, take readily to an exclusively vegetable diet, which is often preferable to city milk and always to flesh food. Xenophon, in his miscellaneous "Anabasis," mentions a tribe of Bithynian coast-dwellers whose children were prodigies of chubbedness, "as thick as they were long," and remarks that said chubs were fed on—boiled chestnuts. Baked apples, pulse, macaroni, whipped eggs, bread-pudding seasoned with sugar and a drop or two of lemon flavor, and such fruits as mellow pears, raspberries and strawberries, can be readily assimilated by all but the weakliest nursery cadets.—OSWALD, in *Popular Science Monthly*.

OPAQUE PATCHES IN THE MOUTHS OF GLASS-BLOWERS.

In the *Gazette Odontologique*. for last month Dr Guinand says that in examining the mouths of glass-blowers, his attention has been attracted to a very curious change caused by the compressed air in the mouth during the operation of expanding the molten glass. This consists in the presence of a semi-opaque patch symmetrically situated on each side on the inside of the cheek. He finds it in the mouths of all the chief glass-blowers and in those of most of their assistants, many of the latter being boys of twelve to fifteen years of age.

Dr. Guinand made some experiments with the view of ascertaining the amount of force necessary in this operation. He found that the pressure of air required in blowing a glass bottle was sufficient to raise a column of mercury from fifty to one hundred millimetres (two to four inches nearly),the maximum being one hundred and fifty millimetres, and the mean from seventy to seventy-five. This stretching of the cheeks being repeated six or seven hundred times a day for many years, the mucous membrane becomes thickened and opaque, and an excessive growth of epithelium takes place. It is to this latter change that the white appearance of the patch is chiefly due; it suggests the idea that a strong application of nitrate of silver has lately been made. The workmen say these watches frequently desquamate, a thin epithelial pellicle coming away.

The importance of a knowledge of this lesson lies in the fact that, when not very highly developed, these spots are undistinguishable from syphilitic mucous patches; they may vary in size from that of a sixpence to a shilling, and have the same bluish-white aspect as a recently formed mucous patch. They may be distinguished by their situation, surrounding the orifice of Steno's duct, and by their being symmetrical, though occasionally they are much more distinct on one cheek than on the other. In the case of young workmen the patches disappear after giving up work for two or three months; but in the case of the older hands, traces may be seen even after several years. It would be interesting to learn, whether anything similar has been observed among glass-blowers in this country.—*British Journal of Dental Science.*

PRELIMINARY STUDENTSHIP.

Dental education is making some long strides, as evidenced by the following from a circular recently issued by the faculty of the Philadelphia Dental College:

Dental collegiate education, in the absence of any required preliminary examination on the part of students entering the classes of schools, must prove a comparative failure unless something be found that shall take the place of such requirement. It is a fact, too indisputable to be controverted,that a majority of young men entering dental colleges are without the advantages of an order of training that fits them to derive any immediate good from the instruction of the chairs; it is, indeed, not infrequently the case that a large part of a first course is consumed in learning nomenclature. In recognition of this defect the faculty of the Philadelphia College has taken on itself the organization of a class in preliminary reading, to be formed of gentlemen proposing to enter the institution, to each of the members of which will be furnished a complete syllabus of the studies of all the departments, together with such continued aids to work as shall properly prepare for college life. Through this syllabus a student will find himself able to judge of his qualifications, and may assuredly find himself as well informed at the time of entering as too many have only been at the date of leaving their school. This preliminary course is recommended most particularly to gentlemen who are willing to work one or more years before coming to Philadelphia. To such the faculty feels that it may offer the advantages of high professional education. Students who are proposing to enter the school next fall are advised to send for the syllabus and commence the study of it at once.

BUCHANAN AND BOGUS DIPLOMAS.

The *Record* (Philadelphia) publishes the confession of the bogus diploma vender, Dean Buchanan, now in prison. He has given up all the books he had, and a mass of valuable information, including a list of the foreign diplomas sold, and a catalogue of the addresses, including over five thousand names of persons who corresponded with him. He gives the names of wholesale druggists of Philadelphia who sold his diplomas, and the names of parties to whom the diplomas were issued. He relates how diplomas were signed by the faculty; once three professors for five dollars each signed five hundred diplomas for him, and for three dollars and fifty cents, diplomas which were to go abroad, were certified to be the Spanish consul, in all about ten thousand names are tangled up in his disclosures. He has given the names of many professional abortionists,and the means whereby they destroy life. He tells of the tricks of his trade,quack nostrums advertised to cure all diseases, and impostors who prey upon public credulity. He recites instances where he robbed graves, and how one day he stole five bodies from the Blockley alms house. He tells of twenty-five concerns in this country and Europe, by which degrees are sold. He figures that fully two thousand bogus diplomas are current in America, and forty thousand more in Europe. He gives the authorities a lever by which they can uproot every diploma dealer in America.—*Daily Newspaper.*

CONDUCTORIAL.

LOCAL DENTAL SOCIETY MEETINGS.

In what manner shall local dental society meetings be conducted? What shall the proceedings be to interest and profit those who may attend? These questions, as all who have given the matter any thought must admit, are important. They have greatly perplexed the more thoughtful element attendent upon these meetings, and until quite recently, this perplexity seemed destined to continue indefinitely. The nearest approach to a solution of the problem, and of which we have any knowledge, occurred at a late meeting of the Buffalo Dental Association, which it was our privilege to attend as an invited guest. · The vexed question was there met,and in great part answered.

The monthly meetings of this association are held in rotation at the residences of its members, and at each meeting some one previously designated for that duty, reads a paper on a subject of his own choosing. General discussion follows the reading, after which members indulge in a light lunch at the expense of the host of the evening. This lunch, by the way, is of the most frugal kind, and consists of articles selected from a list arranged and agreed upon by the association.

The meeting in question was held at the residence of Dr. W. C. Barrett. The paper on this occasion was read by the host, his subject, "Materia Medica and Therapentics," having been assigned him some time before by a vote of the association. When the meeting had been formerly opened, it was announced that the essayest contemplated a "new departure," and had asked the privilege of conducting the meeting in his own way, subject, of course, to the rulings of the presiding officer. There being no objection the request was granted.

The paper, the merits of which it is not our purpose to discuss, was brief, the essayest remarking that he had noticed that members did not take kindly nor listen patiently to monologues. He merely took up four of the different classes of remedies, namely: anaesthetics, anti-spasmodies, stimulants and narcotics. After giving the characteristics of each of these classes, he cited the three principal remedies under each head and gave their therapetical effects, dwelling especially on the first-named class, or anaesthetics. After this he ran rapidly over the list of principal topical remedies, giving their offices and effects. This closed the paper, when the essayest immediately opened a "quiz," not unlike the typical college quiz, except that the questions were not directed at any particular individual. Very little discussion was allowed, members contenting themselves with catagorical answers, and now and then a question. An imaginary patient was introduced and made to exhibit most of the symptoms of such diseases as fairly fall within the province of the dentist. Members were then asked to give a diagnosis and prescribe a course of treatment. For instance, a young lady reported herself a victim of violent toothache, and expressed the desire to take an anaesthetic. While preparations to relieve her were under way, she was suddenly seized with dyspnea, and the question was asked:

1st. What are you going to do about it?

2d. If it be found that she is subject to such attacks, to what are they probably due?

3d. Would you give an anaesthetic in such cases, and if so, what one; and what particular precautions would you use?

4th. If not subject to attacks of this kind what is probably the cause of the present one, and how will that knowledge affect your course?

6th. What remedy would you prescribe in the first case if the patient does not readily recover?

6th. What remedy would you prescribe in the second?

7th. How will you determine the fitness of the patient to take an anaesthetic?

8th. What organs will you particularly examine in case you desire to administer chloroform?

9th. What ones in case you desire to administer ether?

10th. If in the administration of chloform your patient becomes greatly excited what is the probable cause, and what will you do?

11th. And if your patient becomes comatose, then what?

12th. Suppose ether be the agent used, what course would you pursue?

13th. If there be great depression what remedy would you prescribe?

14th. What will you do in case the patient is unable to swallow—what remedy?

15th. If no convenient stimulent be at hand what will you substitute?

16th. If the lips become livid what is the probable cause?

17th. What will you do? Etc., etc., etc.

Symptoms of different diseases were then detailed, and members requested to give diagnoses and name remedies; but the above is sufficient to give the reader an idea of the manner in which the meeting was conducted. Various remedies were next tested for impurities, and experiments made to bring out the leading characteristics of those in common use. Finally, a volunteer patient submitted himself to the essayest, who illustrated the methods resorted to in cases of accident, finishing with the well-known methods of Hall and Sylvester.

The meeting was in no sense a formal one, and yet at its close every one was concious of the fact that he had devoted himself wholly to the subject in hand, and that "Materia Medica and Therapeutics" had not been lost sight of even for a moment. This was unparallelled in our experience of such meetings where, beginning with the subject proper, the evenings entertainment is too apt to end with desultory anecdote or questionable story—or what is almost as bad, "incidents of office practice." To the experienced dentist the work at the meeting in question was a review of a part of his knowledge; and it afforded all abundant material for thought, both in the originality and effectiveness of the method employed, and in the theoretical and practical treatment of the subject. Of course, all subjects are not susceptable of such elaborate treatment, but a near approach to it may be made in a majority of cases.

The plan then for the better management of local dental society meetings would be to give some member, who has mastered or made a special study of some subject, full control so far as the presentation of the subject is concerned, and to hold him wholly responsible for the success of the meeting.

COMING DENTAL MEETINGS.

Most, if not all, of the district dental societies of this State hold their annual meetings this month. The annual meeting of the seventh is set down for the last Tuesday and following Wednesday, at Rochester; the eighth, the third Tuesday and following Wednesday, at Buffalo. We are not informed in regard to the places and dates of meetings of the other district societies.

The Dental Society of the State of New York will meet at Albany, May 11th, and continue in session two or three days. The Secretary, Dr. S. A. Freeman, of Buffalo, writes as follows in regard to this, the thirteenth annual meeting of the Society:

"The Board of Censors will also meet in Albany, Tuesday, May 10th, at ten o'clock, A. M., for the examination of candidates for the degree of "Master of Dental Surgery," (M. D. S.); but no examination will take place during the sessions of the Society.

The annual meetings of this organization are usually important and interesting to the dentists of this state, and are gradually becoming more attractive and profitable. The average attendance is increasing from year to year.

The papers read are creditable, the discussions animated and courteous, and the business transacted with despatch and fairness.

The sessions are open to all who desire to attend, and it is hoped that this year the number of those who shall avail themselves of this privilege will be greatly increased.

Hotel accommodations will be provided at reduced rates to both members and visitors, by the committee of arrangements."

The eleventh annual meeting of the South Carolina State Dental Association will be held at Cheraw, the third of May. Dr. B. A. Muckenfuss, of Charleston, will preside. Information as to details may be obtained of the secretary, Dr. G. F. S. Wright, of Columbia.

HONORS.

In the Chicago *Inter Ocean* appears an elaborate account of the commencement exercises of Rush Medical College. Among other good things we find the following, which is as creditable to the college as it is complimentary to the recipient of the "special honor:" "Dr. W. W. Allport, the well-known dentist, was made the recipient during the afternoon of an unusual and special honor. Out of respect for his eminent services and professional ability, the degree of M. D., from Rush Medical College was conferred upon him, and, in a special speech of congratulation and respect, President Allen presented him with his honorably deserved diploma."

SAMUEL S. WHITE.

The following was adopted by a rising vote, by the Ohio State Dental Society, at Columbus, December 9th, 1880, and ordered sent to the dental journals:

In Memoriam.

Since our last annual meeting, and shortly after its adjournment, the practioners of dentistry throughout the civilized world were shocked and saddened by the announcement of the death, at Paris, France, from congestion of the brain, of our esteemed friend and co-laborer, Dr. Samuel S. White,

Although distant from home, his last hours were cheered, and the bitterness of death were mitigated through the loving administrations of a son and daughter, who had accompanied him.

When the cable transmitted the intelligence of his death, many hearts were burdened with grief in sympathy with his bereaved family.

No words eulogizing Dr. White are needed here. His career is known to us all —a noble life. The sterling character of the man; the uniform worthiness of his aims; his energy and industry; his conscientious, earnest and persitent endeavors to benefit the dental profession, his upright and generous dealing, furnished an example worthy of imitation by all. A record of his manliness and worth is engraved upon the hearts of all who knew him, and deepest in the memories of those who knew him best.

Cherishing appreciative and affectionate remembrances of our personal and professional relations with Dr. White, we desire to assure his family of our unfeigned sympathy with them in the affliction, and to place on reeord this testimonial of a sincere esteem and love for our departed friend.

F. H. Rehwinkel,
G. W. Keely,
J. Taft, } *Committee.*

W. H. Sillito, *Recording Secretary.*

* * *

SQUIBS.

Carbolic acid is an alcohol.

Dr. W. C. Barrett, of Buffalo, is engaged just now in the experimental study of nitrous oxide. Look out for a good paper.

Osmic acid, a favorite reagent with some for demonstrating the presence of nerve fibrils, is sold in hermetically-sealed tubes at the rate of three dollars per gramme.

The Rochester Microscopical Society, with a membership of about one hundred and twenty-five, has just been transformed into the Rochester Academy of Natural Sciences. The principal officers are: Rev. Myron Adams, President, and Mr. Henry C. Maine, Secretary.

CORRESPONDENCE.

F. J. M., asks: "Is there a well-authenticated case of death from nitrous oxide? If so, where and when?"

An examination of the indices of the *Dental Cosmos* for the last ten years reveals the fact there are quite a number of cases of "death from nitrous oxide" on record, but how "well-authenticated" they may be we are not prepared to say. It is much against the record that to the average coroner's jury, the fact of death occurring at the time of administration, or soon after, is proof positive that "deceased came to his death from the effects of nitrous oxide gas."

A. G. N. writes: "I notice in your journal, page ninety,an article on "Rapid Breathing in Relief of Pain." I wish to state that I have practiced the system for a number of years and with considerable success. My mode of operation is to get the confidence of the patient, then pour on a sponge about one table spoon full of ether, and apply it over the mouth and nose, allowing them to breath naturally a few times, after which I urge them by saying: "Breathe faster," "hurry." It is not necessary to force it more than from ten to twenty seconds. They recover from the effects in a happy frame of mind and without exhaustion."

B. F. W. writes: "I see in the ODONTOGRAPHIC JOURNAL for January an article upon the subject of the "Antiseptic Treatment of Roots." I have found that treatment to work admirably. I would ask in what proportion to use these remedies, as I intend adopting the above exclusively in the treatment of such cases. I have used two drachms of iodoform to one ounce of eucalyptus oil."

We have no formula whatever. Our iodoform is still in the case untouched. The eucalyptus oil, however, is in daily use, and for the treatment of roots—particularly those long pulpless—has wholly superceded that dental "poss," carbolic acid. It seems to be especially useful in roots described as "greasy," and which are as little affected by carbolic acid as they would be if treated with water.

BOOKS, PERIODICALS, PAMPHLETS.

We have received the following:

The *Dental Cosmos* for January, February and March; the *Missouri Dental Journal* for the same months; the *Independent Practitioner* for January and February; the *Ohio State Journal of Dental Science* for February; the *Dental Advertiser*, *Dental Office and Laboratory*, and *Dental Headlight* for January; the *Dental Jairus* and *Dental Luminary* for February, and the *Dental News* for March.

ANAESTHESIA, by W. C. Barrett, M. D., D. D. S., M. D. S. Philadelphia: Trustees of Samuel S. White. P. 16.

This is a reprint from the transactions of the American Dental Association now in course of publication in the *Dental Cosmos.* It is undoubtedly the most valuable contribution on anaesthesia ever made the dental profession by one of its own members and through its own journals.

CARBOLIC ACID AND CREOSOTE, THEIR CHEMISTRY AND THERAPEUTICAL APPLICATIONS TO THE PRACTICE OF DENTISTRY. By Truman W. Brophy, M. D., D. D. S. P h. 4.

CARES OF THE SUPERIOR MAXILLA. By the same author. Chicago: Tucker, Newell & Co. P h. 6.

The first is a reprint from the transactions of the Illinois State Dental Society. We give one paragraph for the benefit of whom it may concern:

"Carbolic acid *is a powerful* anti-septic, but *is not*, as many well-informed members of the profession believe, a disinfectant." Carbolic acid *has* the power to prevent decomposition, (hence *it is* an anticeptic), but *has not* the power to destroy or render inoffensive the products of the composition, therefore it *is not* a disinfectant.

REMARKS ON OUR DENTAL LITERATURE, By L. Ashley Faught, D. D. S. Odontographic Society of Philadelphia. P h. 3.

He says: "I have discovered that of the twelve thousand dentists in the United States, only three hundred and thirty-four have, in the nine years ('72 to '80 inclusive) contributed anything to its pages (The *Dental Cosmos*), and even this small number is attainable only by including every member reported as having made remarks in any dental society! Of this contributing, twenty-five have done more than one-third of the work, and fifteen of these occupy positions as teachers in dental institutions. * * * Making an exception of two serials, which were copyrighted for after publication as text books, I have also found that the number of subjects thus presented during the above stated time is one hundred and thirteen. They may be classified as follows: Speculative, sixty-eight; relating to materials and drugs, twenty-five; manipulative, fourteen: pathological and therapeutic, six.

ADDRESS. By Joshua Tucker, M. D. Printed by the Academy. P h. 22.

This address, by one of the oldest practitioners in the country, was delivered before the American Academy of Dental Science, at Boston, last October.

FILINGS.

What a kissery Soldene travels with. They took the wrong mold when her mouth was fashioned—it was intended for twins.

Three deaths from chloroform are reported as having occurred in November and December last. One of these was in Ballard County. Ky.. one in Guy's Hospital. London, and one in Billroth's clinic at Vienna.

"Ma. Rotterdam isn't a bad word, is it?"

"Oh. no. Johnnie dear. that is the name of a foreign city: you will find it in your Geography."

Well. you wouldn't lick a fellow for talking about it would you. Ma?"

"Certainly not."

"Now. honest Ingin. you wouldn't?"

"Of course not darling: why do you ask such a question?"

"Well. Sarah Bernhardt is coming over here to blow on me: she had a saucer full of peanut candy and wouldn't give me a bite. and I told her to eat it all herself and Rotterdam teeth out if she wanted to."

The fusion-disk consists of a revolving disk of soft steel.3-16 of an inch thick. and 42 inches in diameter. driven by steam at the rate of 230 revolutions per minute. In front of this disk is a lathe chuck for carrying steel bars to be cut. A round bar of steel 1⅝ inches in diameter is placed in the chuck and turned in the same direction as the disk at a speed of 200 revolutions a minute. and slowly brought in contact with the disk. It is cut or fused in from two to ten seconds. The novelty of the thing consists in the fact that the disk does not touch the bar. A conveniently-placed stop shows that the disk touches neither at its face nor sides.

A Little scene in a dentist office:

Dentist preparing gold.

Lady patron sitting in dental chair. and now and then rubbing an itchy nose.

He. Got an itchy nose, I see.

She. Yes; what of it?

He. I've heard it spoken of as a bad sign.

She. How so?

He. They say it's a sign you're going to kiss a fool.

She. Don't be frightened. I'm not going to begin on you.

Exit dentist *via* keyhole.

"Men often jump at conclusions," says the proverb. So do dogs. We saw a dog jump at. and insert a full set of teeth in. the conclusion of a cat. which was sticking through the opening of a partly closed door, and it created more disturbance than a church scandal.

It was in a dentist office the other day that the doctor (?) apologized for the dilapidated state of his napkins. "Don't mention it." responded his patron. "I don't mind the holes in the least. That part of the napkin is always sure to be clean." For the next ten minutes nothing could be heard but the office-boy combing his hair with a stool.

THE
ODONTOGRAPHIC JOURNAL.

VOLUME II.—*July*, 1881.—NO. 2.

THE CAT AND ITS RELATIONS.

BY FREDERIC A. LUCAS.

Read before the Rochester Society of Natural Sciences.

In taking for our subject the Cat and its Relations, we will consider it as an animal entirely new to us, and that we wish to ascertain as near as may be the position it holds in regard to other animals, and set it in that place as we would a book in a library. In other words, we wish to *classify* it. Now this very interesting and very difficult problem of classification is one that has long occupied the attention of scientists, and is still far from being satisfactorily settled. System after system has been proposed, only to be overthrown or modified by subsequent investigation, and although the methods of research now at our disposal are far beyond those of any previous age, the chain connecting the highest and lowest members of any great division is far from complete. One important reason for this lies in the fact that many of the links have been lost by the extinction of entire races of animals, which are only imperfectly known to us by their fossil remains. At best but a small portion of the globe is available for palæontological research, and when we reflect upon the large number of new forms already discovered in that limited area, we gain an idea of the number that are still totally unknown.

METHODS OF CLASSIFICATION.

As it is, we have among extinct animals five orders of reptiles, one of birds and two of mammals, that are without living representatives. I recently spoke of the *chain* connecting the members of a group; but this is really a bad simile, unless we consider it a very crooked chain, for no system of classification proceeds in a straight line. The highest animals in any given group are often above the lowest forms of the next, so that really it is like climbing a lofty mountain range, where, although our progress in the main is upward, yet we often find ourselves going down hill. There is one method of classifying the higher animals that would naturally suggest itself, and that is form and habits, and this was employed to some extent by the ancients. Animals, they said, walk, fly, creep or swim, and we will divide them accordingly. This, at all events, was a beginning; but it gave rise to some grouping that seems to us very strange. For example, it brought together Bats and Birds, although this, after all, was not so bad a mistake as it might have been, for there are plenty of people now who have an idea that a Bat is a kind of Bird, and our German friends call it a Flying Mouse. Seals, Whales and Fishes were also more or less thrown together, and some Lizards were placed with the Snakes. Even as late as 1680 an English naturalist took pains to form a definition which should include Whales and Fishes. But little by little, as animals became better known, external appearance became less and less trusted, and other methods were resorted to. Now, as in arranging a library, you would not be guided by the bindings or external appearance of the books, but by the contents or internal structure, so in modern systems of classification, all the large groups are based on similarity of structure, and external characters are only used in defining the smaller divisions. In the solution of knotty questions, no point, however small, is neglected. For example, in determining the position of a bird, its anatomical relations are carefully considered, and next, the manner in which it is covered with feathers—for this varies greatly. The number of the wing and tail feathers is noted, together with the general texture of the plumage. The appearance of the new born chick is an important point, and the structure of the nest and even the number and form of the eggs all help.

THE CAT DESCRIBED.

As we would first look at the title of a book, and then at its contents, we will glance briefly at the external appearance and internal anatomy of our Cat. Externally it is a small fur-clad animal with a rounded head, moderately long ears and tail, and eyes with a vertical pupil. An investigation of its anatomy shows that the skull is rounded, and articulates with the first vertebra of the neck by two projections or condyles; that the canine teeth are long and powerful, and the grinders few in number, and mostly sharp-edged. After saying that the head was round, it may have seemed superfluous to say that the skull was also; but that one does not always conform to the other is shown by examination of the head of the Porpoise.

We find seven neck vertebræ, thirteen dorsals or rib-bearing vertebræ, seven lumbars, three sacrals, to which the hip-bone is fastened, and eighteen caudals. The clavicle or collar-bone is very small, and the bones of the limbs are quite round, and so jointed as to give great freedom of movement. The fore foot has five toes, the hind foot but four, all encased in sharp claws. We notice two peculiarities about the feet: first, that the sole of the foot is not applied to the ground, but that the animal walks on tip-toe; and secondly, that there is a peculiar but simple mechanism for drawing back the claws so that they do not touch the ground in walking. In comparing our Cat with other animals, we will choose the more obvious characters, and by preference those peculiar to the skeleton, as those are the most important, and last after the soft tissues have decayed. It is only by means of skeletal peculiarities that we are enabled to form any idea of extinct vertebrates, and it may not be too presumptuous to compare astronomy to osteology, since by one we grasp the distant in space, and by the other the distant in time.

TWO GREAT GROUPS.

Taking structure as our base of operations, we find that there are two great groups or Sub-Kingdoms into which animals can readily be divided. Examining a worm, snail, butter-fly, or lobster, we find that hard parts to which the muscles attach are on the outside of the body. A fish, frog, bird or mammal have, on the contrary, an internal framework or skeleton, consisting of a chain of vertebræ, to which are appended ribs and limbs. The first is termed *Invertebrata*, and the second *Vertebrata*, and to this latter the Cat evidently belongs, as it has a very complete skeleton. Hence our first step has been to decide that the Cat is a vertebrate. There are five great modifications of the vertebrate plan, forming as many Classes.

FISHES.

The lowest of these, *Pisces*, comprises all Fishes, and is distinguished by the possession of median fins, supported by bony rays, and by limbs which can not be divided into upper arm, fore arm and hand. Moreover, a breast-bone or sternum, is almost invariably absent. Fishes, too, are never clothed with hair.

Referring to the Cat, we recognize that it can not be a fish, since it has no fine rays, and has limbs whose divisions are well marked.

AMPHIBIANS.

The second class, *Amphibia*, contains all Frogs, Toads and Salamanders, besides a few small snake-like animals termed Cæcilians. These Cæcilians, by the way, are interesting from certain characters they have in common with the extinct Labyrinthodons. The Amphibia have affinities both with Reptiles and Fishes, but are distinguished from the former by having a skull with two condyles, and no cartilages running from the ribs to the sternum,and from the latter bythe absence of fin rays, and by having the limbs when present, divisible into three parts. The Amphibia are nearly all small animals, breathing by gills when young, and both by gills and lungs, or lungs alone, when adult. Each half of the lower jaw is composed of several pieces, and does not join the cranium directly, but by the interposition of another bone. Usually Amphibia are covered with a smooth, moist skin. Although the Cat has two occipital condyles, yet the lower jaw is formed of but two pieces, and joins the skull directly. Moreover, the ribs are joined to the sternum by cartilages, and evidently the Cat is not an Amphibian.

THEIR TRANSFORMATIONS.

Many of the Amphibia undergo some wonderful transformations, which it may be worth while to notice. If Stanley had told us that he had discovered in Lake Tanganyika a fish which, after living for some time in the water, shed its gills and tail, and afterward passed the greater part of its life on land, we should be much inclined to disbelieve Mr. Stanley. However, as this animal dwells in every pool, and is simply called a Pollywog, we see nothing remarkable in it. Living in Mexico is a little Lizard-like animal known as the Axolotl. As it has both lungs and gills, it is a very typical Amphibian, and as it reproduces its species it would seem to be a perfect animal, reproduction being usually considered a good test of maturity. But under certain conditions, one of which seems to be lack of water, the Axolotl loses its gills entirely. The skin is shed several times, and the tail becomes round instead of vertically flattened. The eyes also increase in size, and the skin changes color. The result of this metamorphosis is a terrestrial Salamander of the genus *Amblystoma*.

REPTILES.

The third class, *Reptilia*, is composed of such widely different forms as Crocodiles, Lizards, Snakes and Turtles. Varied as they are in external appearance, all agree in the following structural peculiarities: The skull, which has but one condyle, is joined to a short neck, of at the most nine vertebræ. The iliac bone of the pelvis projects much farther behind the socket for the thigh-bone, than in front of it, while the pubes unite with one another. Each half—or ramus—of the jaw is formed of five pieces. The Reptilia are usually covered with horny scales, and, as well as Amphibians and Fishes, have cold blood.

BIRDS.

The double condyle, and lower jaw of but two pieces rule out the Cat from the Class Reptilia, and we pass to that of *Aves*, or Birds. Birds are, of all animals, those most readily distinguished by their outward appearance, and can be described in four words as *animals clothed with feathers*. No other animal possesses feathers, and no bird is without them. Even where the feathers are so loosely webbed as to appear slightly like hair, as in the Apteryx, Emu or Cassowary, the resemblance is entirely superficial, and no one would mistake a feather of either for anything else. The skeleton of a bird bears a certain resemblance to that of a reptile; but while reptiles have short necks and long bodies, birds have long necks and short bodies. Birds have never more than three fingers, reptiles never less than four when they have any. The sternum of birds never has ribs attached to its hinder margin, as in reptiles, and by referring to the diagram we find a different arrangement of the bones of the pelvis. Besides, birds have a peculiar curved process, termed the uncinate process, on the hinder margin of the rib, which is very rarely found in reptiles. Birds and reptiles have been united in a so-called province, and although at first sight there seems no bond of union between a bird and a snake, yet, by the aid of fossils we are enabled to bridge the gap between them. Here is the skeleton of a crow, in which we notice the keeled sternum, toothless beak and short tail, and here a rough restoration of the *Archæopteryx*, which shows a vast departure from any modern bird. There are teeth in the front of the mandible, a total absence of a sternum, no hooked projection on the ribs, and an extremely long tail. Besides all this, the Archæopteryx was provided with feathers only on the thighs, wings and tail. Intermediate between the Archæopteryx and modern birds are the toothed birds discovered by Prof. Marsh, and which were provided with teeth in both jaws, except at the lips, just where they are found in Archæopteryx. Thence it is an easy step to those extinct flying lizards, the Rhamphorhynchus and Pterodactyl, who had three and four fingers of the hand at liberty, the wing being sustained by the enormous little finger. Remove the membrane and shorten the finger, we get an ordinary lizard, and we complete the change by means of the Seps, a small lizard with elongated body and very small legs, and the Pseudopus, which externally has no limbs at all.

MAMMALS.

Returning to our Cat once more, we find that the same peculiarities of the skull which separated it from the Reptilia separate it also from Aves, and, moreover, the Cat, and for that matter no mammal has any processes on the ribs. We have left but one more class in which to search for a place for the Cat—the Class *Mammalia*. Mammals differ vastly in exterior appearance. Usually they are clothed with hair, but they may be entirely naked, as are the Whales. Some are defended by a bony armor, like the Armadillos, and others arrayed in horny scales like the Manis. Mammals may walk, swim or fly, they may live entirely in the water, as do the Whales, in the tree-tops like the Sloths, or underground after the manner of the Moles. But in spite of these apparently great variations the members of this Class, when divested of their soft parts, are found to depart less from a given plan of structure than any other class of vertebrates. They never posses more than seven neck vertebræ, while birds vary from nine to twenty-three; they never have more than twenty-four pairs of ribs, while reptiles have from nine to two hundred and sixty pairs, and fish none up to at least sixty. Mammalia agree in the following points: The number of cervical vertebræ is always seven. We say that this number is constant; but as there are exceptions to all rules, so there is to this, for the Manatee and Hoffman's Sloth have only six, while the three-toed Sloths have nine. There is also a change in the structure of the vertebræ themselves. In Mammals the body of each vertebra consists of one large piece or centrum, capped on either end by a thin disc-like bone termed an epiphysis; but in the four lower classes the body of the vertebra is quite solid.* Then we have two occipital condyles in conjunction with a jaw, each half of which is a single bone articulating directly with the cranium.

THE CAT A MAMMAL.

Now the Cat has all these characters, besides agreeing in other respects with the Mammals, having, for example, a heart, with two auricles and two ventricles, a complete diphragm, and being covered with fur. Thus, by comparison with the various Classes of Vertebrata, we have reached our second conclusion, namely, that the Cat is a Mammal, and our next inquiry is: To what *order* does it belong?

---

* The *Monotremata* have no epiphyses, and in the Sirenia they appear late in life, if at all.

MONOTREMATES.

There are fourteen orders of Mammalia, the lowest of which is that of *Monotremata*, and contains but two species, the Echidina and Ducked-billed Platypus, animals which, in some anatomical points, resemble Reptiles and Birds; so much so that it was formerly thought possible that the young, like chickens, were hatched from eggs. One of these points is the possession of a T-shaped bone called the interclavicle, which joins the sternum, and to which the collar-bones are attached. This bone is found in Reptiles. Another peculiarity is the bony sternal ribs connecting the ribs with the breast bone, a similar arrangement to that found in Birds. The Cat hardly has a colar bone, much less an interclavicle, and so we pass to the curious order of *Marsupialia*, or Pouched Mammals.

MARSUPIALS.

This order, although large, is almost entirely restricted to Australia, and among other things, is interesting from the manner in which certain of its members imitate many of the higher Mammals. Thus we have Rodential Marsupials, others like the Dasyurus that are carnivorous, and while the Kangaroos suggest the Ruminants, the Phalangers point to the Lemurs. The Marsupialia are distinguished by the turning in or reflexing of the hinder part of the lower jaw, and by the presence of two small bones projecting forward from the front of the pelvis. The reflexing of the jaw may appear a slight matter, but it is really of great importance. It is, as you are aware, often asserted and quite popularly believed that a skilled anatomist can reconstruct an entire skeleton from a few bones or teeth, and then proceed to describe the animal's form and habits. This, I am sorry to say, is a very erroneous idea, for ordinarily the best that can be done is to make an approximation to what the animal was. In this connection I can not do better than to quote from Huxley the following:

> Although we know the skull, the dentition, and the most important of the limb bones of Toxodon, no one ventures to predict the characters of its feet, much less to say anything about its internal organization. Even its zoological affinities are extremely doubtful, and it is hard to say whether Toxodon is merely an aberrant Ungulate or the type of a new order.

Usually, however, there is a fixed relation between the parts of an animal's skeleton, and again between that and the outward form and mode of life.

Cuvier decided, from the fragment of a jaw, that it belonged to an Opossum, and his opinion was confirmed by the subsequent discovery of the skeleton. Now Cuvier's judgment was largely based on the reflexing of jaw to which we recently alluded, and it would be pretty safe to predict of any similarly shaped jaw that it belonged to an animal having nineteen trunk vertebræ and marsupial bones, and that the young were born in a very feeble state, and guarded by the mother in a pouch. So that this slight peculiarity is really the key to the entire structure of the Marsupials.

EDENTATES.

As the Cat has no marsupial bones, and as its jaw is not bent in at all, we decide not to place it with the marsupials, and go to the next order of *Bruta* or Edentates. This contains a number of curious animals that differ not only in external appearance but in structure and mode of life. The Sloths are covered with thick hair, and live wholly in the trees, while the Armadillos, who have a bony carapace, burrow in the ground, and the Pangolins are protected by overlapping, horny scales. Among other peculiarities the Long-tailed Manis rejoices in forty-six caudal vertebræ, the greatest number found among Mammals. On the other hand, the Two-toed Sloth has but four, but is furnished with twenty-four pairs of ribs, the greatest number in the class, and the Three-toed Sloth has the exceptional number of nine cervicals. In spite, however, of these great differences, all agree in the absence of incisor teeth, while some are wholly toothless. In those members that have teeth, the teeth are without enamel, and grow throughout life. The bones of the limbs are very solid and Reptilian in their structure.

RODENTS.

Possessing incisors and teeth crowned with enamel, and having hollow bones, the Cat, we conclude, does not belong to the Bruta. If the order just considered is distinguished by the absence of incisors, that of *Rodentia* is characterized by their presence in a highly specialized form, and by the absence of canines. The incisors, which are two in number, both above and below,* continue to grow as long as the animal lives, and by a simple arrangement are kept sharp. The dense enamel is placed almost wholly on the front of the teeth, being very thin, or even absent on the back. Consequently the posterior portion of the tooth wears away rapidly, leaving a chisel-like cutting edge. Indispensable as the growth of the tooth usually is, it sometimes becomes, inconvenient or even dangerous. If a Rodent loses an incisor, the one opposed to it meets with no resistance, and keeps growing until it has been known to penetrate the brain. The six incisors of the Cat, with their crowns covered with enamel, and not growing continuously, preclude it from being a Rodent.

---

* The *Leporida*, or Hares, have two small upper incisors directly behind the others.

INSECTIVORES.

The *Insectivora* are small animals which, as the name indicates, life chiefly on insects. Among them are found the Shrews, the smallest of all Mammals. This group is hard to define, but is distinguished from the small carnivores with which it runs any risk of being confounded, by the numerous grinding teeth being furnished with sharp tubercles, and by having a collar-bone. The Cat is easily separated from this order.

BATS.

The *Cheiroptera*, or Bats, are closely related to the Insectivora. They are easily known by having the fore limb formed for flight, and are the only Mammals that do fly; the so-called flying squirrels and flying lemurs merely having a membrane extending from the side of the body to the wrist and ankle, of sufficient extent to act as a parachute. From the structure of the fore limb we conclude that the Cat does not belong among the Cheiroptera. In the wing of the Bat we have a good example of how nature employs different methods to accomplish similar results. The wing of the bird is formed of feathers attached to two united fingers. The Pterodactyl had a membraneous wing running from the body to the enormously lengthened little finger, three or four digits being at liberty. Finally, the Bat's wing is formed by a membrane supported by four fingers, only the thumb being free.

WHALES.

The members of the Order of *Cetacea*, or Whales, are recognized by their fish-like form, the absence of hind limbs, the paddle-like fore limbs, and the position of the nostrils, which are placed on top of the head. Not having any of these characters, and, moreover, being covered with thick fur, instead of shiny naked skin, we naturally do not call the Cat a Cetacean. In the Bats we had an order formed for navigating the air, and in the Whales we have one framed exclusively for life in the water, locomotion being performed as in fishes by the powerful tail. We noted in the commencement that Whales were formerly considered as fishes; but a very cursory comparison of one—say a Porpoise—with a Perch, shows that in spite of exterior resemblance there is a wide difference between them.

First we notice that while the fish has a vertical tail, and breathes by gills, the Porpoise has a horizontal tail, and respires by lungs. A little dissection shows that the Porpoise has seven cervicals, a sternum, no fin rays, and a paddle formed on this plan, and that the fish possesses fin rays, no sternum, and a certain kind fin.

The Whales are not only the largest living beings, but it is only very recently that any fossils have been discovered that indicate the previous existence of any animals of equal bulk. The indiscriminate use of the words huge, monstrous, immense, would give the impression that the animals of to-day are far inferior in size to their predecessors; but the fact is that none of the extinct reptiles upon whom so many large sounding adjactives are lavished, even approach the dimensions of a moderate sized Whale.

MANATEES.

Closely resembling the Whales are the members of the order *Sirenia*, or Manatees. They are, however, much less fish-like in appearance, have a shorter skull, different dentition, and nostrils opening nearly at the end of the muzzle, instead of on top of the head. Their anatomy bears a strong resemblance to that of the Ungulates.

PROBOSCIDIANS.

The same features which excluded the Cat from the Cetacea, exclude it also from the Sirenia, and we pass to the *Proboscidea*. This order contains the Elephants, of which there are at present but two species, although formerly many more existed, varying in size from the Mammoth, which stood thirteen feet high, to the little Elephant, whose remains found at Malta indicated a height of only five and a half feet. Besides the proboscis, so characteristic of this order, and which enables these short-necked, unwieldy animals to feed alike from herb to tree, the Proboscidea have a very peculiar dentition. The upper incisors are developed as tusks, and like the corresponding teeth in Rodents, grow continuously, while they are destitute of enamel, like the teeth of Edentates. The molars succeed one another to the number of six, but instead of one tooth forming under another and replacing it from below, each molar forms behind its predecessor, and gradually pushes it forward, the front of the tooth in use being as steadily worn away.

HYRAXES.

According to Tennyson, King Arthur said:

> "The older order changeth, giving place to new,"

and the animals which constitute the order of *Hyracoidea* are good illustrations of this fact. Once the Hyraxes were classed with the Rodents; next, although no larger than a Rabbit, they were placed after the Rhinoceros, and finally they were given an order by themselves. It may seem strange that they should have been so changed about, but part of the trouble, like many another, arose from trusting too much to appearances. From its small size and gregarious habits, and from the fact that its upper cutting teeth grow like those of Rodents, it was put in that order. More careful investigation showed that its feet were armed with hoofs, not claws, and that its teeth and skeleton were far more like those of a Rhinoceros than a Rabbit, so it was shifted to the Ungulates, and finally, on account of its peculiarities, set apart by itself. The Hyrax has in some respects more backbone than any other Mammals, for it has twenty-two rib-bearing vertebræ and eight lumbars, a greater total number than is found in the Sloths. The Hyrax was known to the Jews, and the passage in the Bible which says: "The conies are but a feeble folk, yet make their houses in the rocks," refers to it.

HOOFED ANIMALS.

The great order of *Ungulata*, or hoofed animals, includes nearly all the large Quadrupeds, and those most useful to man. Its members range in size from the Hippopotamus to the tiny Musk Deer, no larger than a kitten. Among the noticeable forms are the Rhinoceros, Tapir, Hog, Horse, Ox, Deer and Giraffe. This order is characterized by the absence of a collar-bone, by the presence of hoofs, and by grinding teeth of great complexity, formed of plates or folds of enamel imbedded in dentine, and with the crown of the tooth never wholly covered with enamel. The canine teeth are usually absent, and there are never more than four complete toes on a foot. By the simple teeth completely cased in enamel, by the large canines—although this is not a certain distinction—by the presence of claws and of five fingers on the fore foot, the Cat is separated from the Ungulates.

CARNIVORES.

Our last order but one is that of *Carnivora*, or beasts of prey. In them the collar bone is usually lacking, or, if present, is very small, the canines are large, and the crowns of the molars completely covered with enamel. The trunk vertebræ are almost invariably twenty in number, and the toes—never less than four—are armed with claws. Here evidently we have an order with which the Cat agrees perfectly, and we decide that the Cat belongs to the order of Carnivora.

THE CAT A CARNIVOROUS MAMMAL.

Let us suppose now that we are going to construct an animal for a predatory life. We will make the skull small, so that it may not render the animal top-heavy. As our animal is to live upon other beasts, it will need sharp-edged teeth, and we will plant them in rather a short jaw, so that the muscles may have great power by acting on a short lever—the jaw being a lever of the third order. As we shall need powerful muscles to work the jaw, we must widen the cheek-bone to give them room, and as the jaw will be exposed to severe strains by the struggle of the prey to escape, we shall so articulate it that it shall run but little risk of being dislocated. As our ideal animal may wish to carry its food to some secure place where it may feed in safety, we will give it very strong neck muscles to enable to raise and carry off its prey, and to furnish attachments for these, we shall have to roughen the base of the skull, and put long processes on the first dorsal vertebræ. The animal will need great freedom of movement in the fore limbs, so as to strike rapid blows, but at the same time we need power, and so we add sharp ridges, to which the muscles can fasten. Our animal must be able to spring suddenly on the creatures it lives upon, so we make the heel bone long, to give leverage, and put long processes on the lumbar vertebræ, to which we secure the leaping muscles. Then we will arch the foot bones, because sometimes the creature we are constructing may miss his leap, and we do not wish the shock of a fall to injure it. Finally, it ought to have pretty sharp claws, and that they may not bear on the ground, we will make them draw back when not in use. We have, we think, constructed a pretty good Carnivorous Mammal; and at the head of the order Carinorva we find a family—the *Felidæ*—possessing all these characters. The Cat, too, that we have been studying has them also; hence there can be no doubt but what it is of the genus *Felis*. We need but a name to denote just what Felis, our Cat, is; and as we find that the Cat has been domesticated since the earliest days, we call it *Felis domestica*—and thus complete its classification.

THE PHILADELPHIA DENTAL COLLEGE SYLLABI OF STUDIES IN OPERATIVE AND PROSTHETIC DENTISTRY.

In the case of these syllabi, the hints to study are conveyed in the form of queries, merely for purposes of convenience and directness. It is, of course, to be understood, that the questions suggested have no reference whatever to any examination. The student is to learn of the various subjects what he can. Syllabi are simply aids to, not the accomplishment of, studies.

OPERATIVE DENTISTRY.

What are some of the principal operations included under the head of Operative Dentistry? Describe the examination of the mouth in search of caries? What are the principal theories in regard to decay? How many kinds of decay have we? What are the indications of caries? What is the mechanical treatment of it, and what the therapeutical? To what is the color of decay due?

What are the three possible conditions of the mouth? How would you correct acidity? how, alkalinity? What is the cause of decalcification of tooth structure?

Because dentine is discolored, is it necessarily decayed? How much decay is to be removed? what exceptions? Describe, in detail, the preparation of margins of cavities.

What means have we of keeping teeth dry in filling? Tell how to apply the rubber dam to the different teeth.

Name materials for filling teeth. Which is considered the best?

What are the points recommending gold as a filling material? What is the difference between *cohesive* and *non-cohesive* foil? What constitutes a good filling? How is cohesive gold condensed? how non-cohesive? How do you anchor a cohesive gold filling? What cavities are the most difficult to fill? What effect have phosphorous, sulphuretted-hydrogen gas, sunlight and heat upon gold foil? What is the difference between *contour* and *flat* filling? Describe the process of shaping and finishing a filling after introduction.

What is the composition of oxychloride of zinc for dental use? What is the composition of phosphate of zinc for dental use?

In what teeth and cavities is it best to use tin foil? How is it used? What are the objections to its use?

What is the difference between an amalgam and an alloy? Name the principal metals entering into dental alloys. What are the properties of such metals?

What are the points regarding gutta-percha as a filling material? What mineral substances are often incorporated with gutta-percha to give it body as a filling material?

What filling material should, as a rule, be used for oral teeth? What is the two-fold object in filling teeth, especially the oral?

Name the condition governing the preservation, or devitalization of an exposed pulp.

What materials are used for capping exposed pulps, and what are their relative value? Describe minutely the process of capping a pulp?

Is a tooth dead when the pulp is extirpated? How can a tooth live when the pulp is dead? Of what value is a pulp to a consolidated tooth?

When is it most important to preserve the teeth?

How are arsenical applications to be made? how long left in tooth? How about use of arsenic in deciduous teeth?

How soon can a tooth be filled after extirpation of pulp? If a root is properly cleansed and filled, is trouble to be expected? What roots are most difficult to enter? why? Name different materials used in root-filling, and manner of using them?

Is there any difference between the treatment and filling of a tooth with putrescent pulp and one just devitalized? Describe treatment in each case. How would you diagnosis a dead pulp in tooth?

How would you treat a discolored tooth? Can teeth be bleached? if so, how would you accomplish it?

Is it important to preserve the deciduous teeth? why?

Of what importance is a knowledge of the internal anatomy of a tooth? Do teeth differ in the same mouth in structure or solidity? if so, what is the reason?

Is transplantation of teeth possible, and is it to be recommended? Is replantation always successful? when is it most so?

What is sensitive dentine, and to what is it due? Name different methods of remedying it?

From what nerve do the teeth receive sensation? What arteries supply the teeth?

What are the effects of ether, chloroform, and nitrous-oxide gas when administered for general anæsthesia? Which is considered the least harmful?

What is periodontitis? Name symptoms and treatment in its earlier and latest stages?

What are the manifestations of dento-alveolar abscess? Describe methods of treatment and medicaments employed? What is the *heroic* method of treatment adopted by some practitioners?

Describe, in detail, some of the best methods of pivoting?

Which teeth are the hardest to extract, and why? What accident is liable to happen to the lower jaw in extracting? How would you reduce luxation? What accident is liable to happen in the extraction of the superior wisdom teeth? Should oral roots, if good, be extracted?

How does absorption of alveolar structure take place?

What styptics are used to counteract hemorrhage?

Under what circumstances should the sixth-year molars be extracted, and when should they be retained? If extracted, at about what age should it be done? If extracted before the eruption of the second molars, what effect will be had upon the other teeth? If extracted later what will be the effect?

What is implied by the term orthodontia? Mention some of the difficulties attending the correction of irregularities? Between what ages should the operation be undertaken? What are the principal movements desired of teeth in process of regulation? What are the best methods of producing *traction?* what of *extention?* what of *rotation?* Describe the best means of retaining teeth in their new positions until they become firm? How long should teeth be so retained before all appliances are removed?

PROSTHETIC DENTISTRY.

Previous to making an artificial denture for the mouth what is to be done? What pathological conditions have generally to be considered? What is to be done when such conditions exist? About how long, after extraction, may a mouth be left without a plate?

What is the first thing to obtain in the making of a plate? What are the most prominent materials used for taking impressions? What are the peculiar properties and uses of each? Where, and why should one alone always be used?

What is wax, and what the difference between white and yellow? What compounds of wax and gutta-percha are used, and which is the best? What is the proper manner of softening wax?

What is the best means of softening "Modeling Compound?"

What is plaster of Paris? its chemical formula? What is the chemical action when water is mixed with it? What substances are used to hasten *setting*, and what does it do when it sets?

What is the proper method of taking full upper impressions? How can you judge of a good impression? How can nausea be prevented? What is to be done if plaster lodges in the throat or trachea?

What may be said for, or against *deep* air chambers?

How is an accurate articulation obtained?

What considerations are to be noted in selection of artificial teeth? How should teeth be arranged in artificial dentures?

What is the composition of vulcanite? what is the composition of celluloid? What are the three methods of working celluloid? How are vulcanite and celluloid, respectively, repaired? Describe the method of making metal plates with vulcanite or celluloid attachments. What is the method of vulcanizing without pressure?

What is the general thickness of *upper* gold plate? what of *lower?* What is the composition of a good eighteen-karat gold plate alloy? Name some eighteen-karat gold solders.

What is the composition of clasp alloy? What is the proper method of clasping teeth with conical crowns? what of those with *inverted* conical crowns? Which teeth should never be clasped?

What are the different methods of riveting?

What is the composition of mineral teeth? Name minerals used, and method of manufacturing mineral teeth.

What is an obturator? What is an artificial velum?

What is a *cast*, and what a *model?* Describe the mode of procedure in continuous gum work. What are the melting points of gold, silver, platinum, tin, copper, zinc and lead? How should teeth be ground and fitted to a metal plate? What is the difference between a *straight*-pin and a *cross*-pin tooth? What is the composition of a good silver plate alloy? What metals are used for dies and counter-dies?

How would you prepare a cast for continuous gum work? What metal is best adapted for use as a base-plate in this style of work? What is the composition of gum enamel? What is the infusible material in mineral teeth? What materials are used to give color to body and gum of mineral teeth? What is the method of staying teeth in continuous gum work? Can continuous gum plates be repaired? how? What is the method taught of preparing and completing the platinum base-plate? What is a mineral plate? how is it made?

How is zinc separated from gold? How is tin?

Is it proper to select irregular and overlapping teeth in order to have them appear natural in the mouth? What should be the relative size of artificial teeth as compared with the natural ones?

How should teeth be invested for soldering? What makes solder flow? Name the three points of the blow-pipe flame.

IODOFORM.

Our dental brethern often find use for different preparations of iodine. When chronic swellings about the face are to be reduced, we naturally think of iodine, and we frequently, if not generally, resort to the simple or compound tincture. The former gives mainly local action, while the latter is not sufficiently concentrated to give us satisfactory results. We suppose the compound, named as our heading, would be used more frequently were it not for its offensive odor. It presents one of the mysteries of chemical combination. It is well-known that iodine is a local irritant, and if forty-two parts of it were mixed with one part of charcoal, the mixture would still be irritant. But iodoform is a *combination* of iodine and carbon in these proportions, and these combinations, instead of being an irritant, is a local anæsthetic. It can, therefore, be used on tender, sensitive, or even raw surfaces, with comfort and relief, where iodine is utterly inadmissable.

Iodoform is conveniently used in ointments. It can be mixed with lard or simple cerate, say fifteen or twenty grains to the ounce, but we would still have the objectionable odor. Dr. William Martin, a very popular and scientific druggist, of Cincinnati, tells us that the addition of a small proportion of tannin destroys the odor. Also, in the *Ohio Medical Recorder*, we find a formula which is said to accomplish the same end, thus:

"R. Iodoform, grs. xv
Bals. Peruv., grs. xxx
Mix."

"For an ointment, add vaseline; or for solution, glycerine oz. iij."

For tumors on the gums, the solution will probably be found the more pleasant; for external use, we should prefer the ointment. When the local action of iodine is desired, nothing better can be devised in the present state of knowledge.—EDITORIAL, in *Ohio State Journal of Dental Science.*

BOOK PHYSIOLOGY ABROAD.

The London *Globe* gives a ludicrous illustration of the results of physiological teaching in the girls' schools of the English metropolis. It seems that the National Health Society, laudably desirous of promoting the increase of practical physiological intelligence, offered prizes to be competed for by the pupils of the girls' schools under the control of the London School Board. The response, however, was not very lively. Out of two hundred and thirty-four schools only eleven sent competitors, it being presumed that in the other schools physiology is either not taught at all, or so poorly taught that there was no emulation. The eleven schools which were represented in the examination, we are to suppose, were the best girls' schools under the jurisdiction of the board. Two hundred and fifteen girls attended and competed for the prizes, the examination being conducted by Mr. McWilliam, who reported the result to the London School Board.

The *Globe* says: "Many of the children appear to have been utterly unable to understand the terms of the questions. 'Mention any occupations which you consider to be injurious to health, giving reasons for your answer.' This question, Mr. McWilliam says, especially appears to have puzzled them. One girl's complete answer to this question is: 'When you have a illness it makes your health bad, as well as having a disease.' Another says: 'Occupations which are injurious to health are carbolic acid gas which is impure blood.' Another complete answer is: 'We ought to go in the country for a few weeks to take plenty of fresh air to make us healthy and strong every year.' Another complete answer is: 'Why the heart, lungs, blood, which is very dangerous.' The word 'function' was also a great puzzle. Very many answered that the skin discharges a function called perspiration. One girl says: 'The function of the heart is between the lungs.' Another says: 'What is the function of the heart? Thorax.' Another girl, in answer to the sixth question says: 'The process of digestion is: We should never eat fat, because the food does not digest.'

"Another class of errors is that of exaggerated statements, one girl answering, 'A stone-mason's work is injurious, because when he is chipping he breathes in all the little chips, and then they are taken into the lungs.' Another says: 'A boot-maker's trade is very injurious, because the boot-makers always press the boot against the thorax, and therefore it presses the thorax in and it touches the heart, and if they do not die they are cripples for life.' Several girls insist that every carpenter or mason should wear a pad over the mouth; and one girl says that, if a sawyer does not wear spectacles, he will be sure to lose his eyesight. Finally, one girl declares that 'all mechanical work is injurious to health.' Another child says that 'in impure air there is not any oxygen, it is all carbonic acid gas,' Another says that if we do not wash ourselves 'in one or two days all the prespiration will turn into sores.'

"One girl states that 'when food is swallowed it passes through the wind-pipe and stops at the right side, some of it goes to make blood, and what is not wanted passes into the alimentary canal.' Another girl from the same school says: 'Venous blood is of a dark black color, and when it reaches the heart it is made by the heart a bright red color.' Several girls from the same school repeat this last error. Another girl says: 'The chyle flows up the middle of the back bone and reaches the heart, where it meets the oxygen and is purified.' Another says: 'The work of the heart is to repair the different organs in about half a minute.' Another says: 'We have an upper and a lower skin; the lower skin moves at its will, and the upper skin moves when we do.'"—*Popular Science Monthly.*

WHEN MEN ARE AT THEIR BEST.

Dr. Beard states that from an analysis of the lives of a thousand representative men in all the great branches of the human family, he made the discovery that the golden decade was between forty and fifty; the brazen between twenty and thirty; the iron between fifty and sixty. The superiority of youth and middle life over old age in original work appears all the greater when we consider the fact that all the positions of honor and prestige—professorships and public stations—are in the hands of the old. Reputation, like money and position, is mainly confined to the old. Men are not widely known until long after they have done the work that gave them their fame. Portraits of great men are delusions; statues are false! They are taken when men have become famous, which, on the average, is at least twenty-five years after they did the work which gave them their fame. Original work requires enthusiasm. If all the original work done by men under forty-five was annihilated, they would be reduced to barbarism. Men are at their best at that time when enthusiasm and experience are almost evenly balanced. This period, on the average, is from thirty-eight to forty. After this the law is that experience increases, but enthusiasm decreases. Of course there are exceptions.—*Christian Intelligencer.*

THE DEMONSTRATION OF TISSUE-ELEMENTS.

The following is from the report of the committee on exhibits and improvements in microscopy at the fifteenth annual meeting of the Biological and Microscopical Section of the Academy of Natural Sciences of Philadelphia:

Your committee can look back to the beginning of microscopy in Philadelphia, and at that time, and for a long period after, Nachet's miscroscopes were the only ones—with few exceptions—then in use. Now those inferior French instruments are not reported at our meetings.

It would be neither profitable nor interesting to report all the commoner objects shown at the meeting, not because such exhibits have not equal educational value with rarer things, but for the reason that they have been mentioned on previous occasions and in the reports of similar meetings elsewhere. We will ask attention, therefore, to such objects only as best mark the progress of microscopy at this time.

Many preparations of animal tissues, human and comparative, were shown, such as injected lung, kidney, brain, skin, etc., and some were stained with carmine, then bathed in acid and mounted in balsam, *secundum artem obsoletum;* and all such looked about as well as could be expected.

Best experience, however, is becoming convinced that it is no longer good work to stain only the bioplasts, and to fill the vessels with gelatine colored with carmine and mounted in balsam. Around every bioplast so treated is the cell-body, larger or smaller, which remains invisible. Moreover, growing and finest vessels cannot be structurally demonstrated in that way, neither can the connecting tissues which bind all other parts together be demonstrated or studied by these old processes.

Such work has no longer any significance in the entire and correct interpretation of the tissues, but it does create abnormal stomata and apocryphal perivascular spaces to be found only in the books. These relics of a *past* era in microscopy should now be placed carefully away in the back drawers of histological cabinets, thence to be dug out like strange fossils by coming generations of microscopists.

The time has come to move forward by doing better work in which more tissue elements shall be demonstrated. Some recent sections, double-stained by Cole & Son, of London, were shown at the meeting, and they revealed more tissue elements than any other balsam mounts yet seen this side of the Atlantic.

The division of cartilage cells during change towards bone—the so-called osteoblasts—medullary cells and fat cells, all with bioplasts showing division and vacuolation; not nebulously and doubtfully, but sharply differentiated under five hundred diameters, with the binocular could be seen, educating us more fully into a better understanding of such things. We welcome such advanced work regardless whence it comes.—*American Journal of Microscopy.*

ANALGESIA BY RAPID BREATHING.

Prof. H. C. Wyman reports (Detroit *Lancet*) some cases in which anæsthesia was induced in the dog by producing rapid artificial breathing. A terrier was fastened to the table and the nozzle of a Davidson's syringe introduced into the trachea and worked rapidly. The chest was quickly distended, and soon all attempts at respiration ceased. Various cuts were then made, and the crural and sensory root of the fifth nerve pinched and irritated, but no evidences of pain were produced. The dog after a time resumed respiratory movements, but died in a few hours with epileptiform convulsions. A similar analgesic condition was produced on another animal.

The theory offered in explanation of this is that the process interferes with oxydation and the blood is unduly filled with carbonic acid, the effect of which is to benum the system. This can hardly be, however, for by rapid breathing a condition of apnœa with cessation of respiratory movements is induced. Now, apnœa means that the respiratory centre in the medulla has an over supply of oxygen. It is difficult to believe that this over-supply of oxygen is confined to the medulla, while the rest of the system is sur-charged with carbonic acid gas.—*Medical Record.*

DANGERS OF DENTISTRY.

Usually dental surgeons take great care to keep their implements clean. Sometimes, however, the patient is disgusted with the sight of more or less ancient blood stains on forceps and other implements which are to go in his mouth.

A correspondent in Maine, submits a local newspaper report of an accident to a Bangor dentist which suggests the query whether there may not be danger of blood poisoning to the hazard of the patient's life when the surgeon is not careful with respct to the cleanliness of his implements. In the case reported the accidental pricking of a finger with a sharp instrument used by the dentist while filling a tooth, resulted in a serious case of pyæmia. In this instance the dentist was the sufferer. Suppose the poisoned tool had pricked the gum of the patient? Whether the poison came from the diseased tooth then being operated on, or was due to some previous operation, does not appear, and would not much matter to a patient who should be poisoned in that way. In either case the injury might be fatal. From a moral point of view, however, it would make a great difference whether the patient furnished the poison or the dentist. It goes without saying that untidiness in the dentist's chair is dangerous as well as disgusting, and should not be tolerated.—*Scientific American.*

CONDUCTORIAL.

WISCONSIN DENTAL COLLEGE.

AN "ELEGANT DIPLOMA AND DEGREE" FOR TWELVE DOLLARS.

Dentists throughout Western New York have recently been made the recipients of a set of three printed documents issued in the interest of the "Wisconsin Dental College." Each set is accompanied by a printed envelope addressed to "Dr. Geo. Morrison, Wisconsin Dental College, Delavan, Wis." They are interesting, hence their reproduction here.

The first of these printed documents reads as follows:

WISCONSIN DENTAL COLLEGE.

Incorporated Under the

LAWS OF WISCONSIN.

D. B. Devendorf, M. D., Professor of Anatomy and Surgery.
Dr. John Flinn, Professor of Operative Dentistry.
Dr. George Morrison, Professor of Mechanical Dentistry.

The Third Regular Session will commence October 15th, 1881, and continue until the 1st of March ensuing, with GUSTAVUS NORTH, A. M., D. D. S., of Iowa, as Professor of Operative Dentistry and Therapeutics.

DELAVAN, Wis., ________________, 1881.

DR. ____________

Dear Sir:—By mail I send you the WISCONSIN DENTAL COLLEGE ANNOUNCEMENT. Should you conclude to take a full or part of the term, we will give you practical instruction which will be to your advantage; however, if you do not desire a College course, I take the liberty to make you this offer. Fill the blanks in the enclosed printed statement and return. If *satisfactory* to the Faculty, will send you in a cylinder box by express C. O. D. $12.00, an elegant *Honorary* Diploma and Degree D. D. S. (Doctor of Dental Surgery), with your name artistically hand-printed. This Diploma is 22x17 inches, elaborately engraved on *parchment* with signatures of the Faculty and College Seal. Should you receive this compliment from the WISCONSIN DENTAL COLLEGE, we shall expect your influence by way of assisting us to students in the future.

Respectfully Your Servant,

GEO. MORRISON, President.

N. B.—The Faculty of the WISCONSIN DENTAL COLLEGE, believing they have as many legal and moral rights as other citizens, will commence the publication of a quarterly journal, at Delavan, to be devoted to the interest and advancement of the profession, the first number to appear in June next and designated as the "Wisconsin Dental Argus," with H. R. Ames, D. D. S., as Editor. Specimen copies will be sent to the profession. Until that time said Faculty will gratefully accept the free advertising so generously given them by other journals. Without comment the following is copied from the Dealvan *Republican* of Feb. 4th, 1881:

> "The Wisconsin Dental College is a regular legally organized corporation, located at Delavan, Wisconsin. Of course, every new school of this character has to contend with its opposition, principally from old established institutions and their alumni, who many times resort to unfair means to increase their own patronage by traducing others. The most common of which is detrimental articles in dental journals, which seem to be published in the interests of the profession alone, but are really advertising mediums owned or controlled by dental colleges."

Note.—Owing to the large amount of labor involved in the publication of the first issue of our Dental Journal, its appearance has necessarily been deferred until the month of June.

The "inclosed printed statement" mentioned above, and in which the recipient is requested to "fill the blanks," is as follows:

.... 188

This Statement is made to the Faculty of the Wisconsin Dental College, located at Delavan, Walworth Co., Wisconsin, for the purpose of procuring an Honorary Diploma and Degree D. D. S. (*Doctor of Dental Surgery.*)

I am a Regular Practicing Dentist.

I am a Resident of..

Age........................years. Have Practiced Dentistry........................years.

Signed.................................... ....

Witness..

The third, or announcement proper, repeats much of that contained in the first, with the additional statement:

"The requirements for graduation are the same that are usually demanded by all reputable Dental Schools, except in this institution students receive Diplomas and degree D. D. S. for what they know and can do, and not for the number of terms spent at the College."

We are further informed that the Spring term will begin April 15th, 1881, and continue till July following.

The fees are as follows:

Matriculation, - - - - - -	$ 5 00
Tickets for one Term, - - - - -	60 00
Diploma, - - - - - - - -	25 00

It strikes us that there are a few things in these documents that call for explanation.

First. The Professor of Anatomy and Surgery has a degree, while the Professors of Operative and Mechanical Dentistry have the every-day title only; in other words, the former is an "M. D.," while each of the latter is merely a "Dr." It would appear that while there were degrees enough for others at twelve dollars each, there were none for conspicuous members of the faculty at any price.

Second. The prospective session is announced as the "third." When were the first and second held? Where? Who delivered the lectures? To whom and how many were they delivered? Who are the graduates (if any) of the first and second sessions?

Third. The gentleman who is to officiate as Professor of Operative Dentistry and Therapeutics is announced as a "D. D. S., of Iowa." Does this refer to the state of that name? If so, the information is indefinite, and consequently of little value. If "Iowa" is a city or village of Wisconsin we have nothing further to say, except that the fact might have been mentioned, if only for the benefit of those who do not live in or near Delavan.

Fourth. If a degree only is wanted, why go to the trouble and expense of this college course, when the same may be had without trouble and at much less expense? It would be "*Honorary*" of course, but who need know that?

Fifth. "If *satisfactory* to the Faculty." How could so simple a "Statement" be other than "*satisfactory?*"

Sixth. "We shall expect your influence by way of assisting us to students in the future." In other words, the recipient of the diploma of this institution pays twelve dollars in cash, and the balance, more or less, in "influence."

Seventh. For the benefit of the "Delavan *Republican*," or the party who wrote (or inspired) the article from which the above extract is taken, we will state, what every reader of dental journals knows, that such journals are published "in the interests of the profession" *and their advertisers.* Also that such journals are not "owned or controlled by dental colleges." Contrary to the statement in this extract, there is not a journal in this country "owned" by a dental college; there is not a journal "controlled" by a dental college; while as to their being "advertising mediums" for such institutions, the fact is that dental college advertisments are among the least profitable that publishers make room for.

In closing, we repeat that a few things need clearing up. Perhaps the "*Wisconsin Dental Argus*" will do it for us.

SOCIETY MEETINGS.

AMERICAN DENTAL ASSOCITION.

Rumor has it that the time of the annual meeting of this organization, which will be held in New York, has been changed by those in authority, from the second Tuesday in August to the second Tuesday in July. The reason for the change is said to be the desire on the part of some of the leading members to send a delegation to the dental section of the International Medical Congress, which meets in London, England, the first and second weeks in August. While the calling of the meeting a month earlier than usual will be very gratifying to those who hope to go abroad as delegates, it is likely to greatly disappoint and inconvenience those obliged to remain at home, and whose arrangements for a Summer tour are not, as a rule, complete till later in the season. Then again many who would like to attend the meetings of both the American Dental Association and the Dental Association of the United States, must make two trips to New York, or attend but one meeting, or not go at all. It looks like an unfortunate move, but in the absence of the official announcement of the change little can be said. Two questions suggest themselves: Is the change according to the constitution and by-laws? Would not a special meeting answer every purpose for which this one is called?

DENTAL ASSOCIATION OF THE UNITED STATES OF AMERICA..

This association meets in New York the second Monday in August. The call for the meeting has not as yet reached us.

PENNSYLVANIA STATE DENTAL SOCIETY.

This Society will hold its next annual meeting at Point Chautauqua, on Chautauqua Lake, a delightful Summer resort about fifteen minutes ride by boat, from Mayville, N. Y. The meeting will begin Tuesday, July 26th, and continue through Wednesday and Thursday. Point Chautauqua is very easy of access to many of the dentists of this State, all of whom are cordially invited to be present and take an active part in the discussions. The official announcement of the meeting, also the programme, will be mailed to those who have not already received it, on application to Dr. W. E. Magill, Erie, Pa., Chairman of the Executive Committee.

WISCONSIN STATE DENTAL SOCIETY.

The eleventh annual meeting of this society will be held in Milwaukee, on the third Tuesday in July. A general invitation to be present is extended to all resident and neighboring practitioners.

We hope members of this Society will find time to look into the affair advertised as the "Wisconsin Dental College," and either endorse its legal and moral right to be, or begin a movement whereby it may be thoroughly and for all time "squelched."

SIXTH DISTRICT DENTAL SOCIETY.

The following officers were elected at the annual meeting of the above society, held at Binghamton, May 5th, 1881:

L. E. Ireland of Oneonta, President; E. S. Walker of Greece, Vice-President; A. T. Wright of Owego, Recording and Corresponding Secretary; F. B. Darby of Elmira, Treasurer.

Censors—A. M. Holmes. F. B. Darby and H. Hodge.

Delegates to State Society—L. E. Ireland and A. M. Holmes.

Committee on Semi-Annual District Meeting—Drs. Ireland, Wright and G. H. Smith.

The Fifth and Sixth District Societies will hold a union meeting at Cortland, beginning Thursday, October 5th, 1881.

A SUGGESTION.

"Alert," the *Dental Miscellany* man who "Peeps into the magazines," saw our April number and went right off and wrote the following:"

"The *Odontographic Journal* is full of interest, and presents a neat appearance. Will it take a suggestion? It has the habit, when indicating from what source its selected articles come, to state baldly, (for example), 'Oswald in *Popular Science Monthly.*' It would look so much better to put the initials of the writer of the selected articles, besides being, in some cases, a convenience to the readers."

But "Alert" forgets that our selections are usually (perhaps always, but we haven't time now to look through our back numbers), from writers whose word is law, and that there is very little chance of big men and little ones becoming mixed.

If he were to see, for example, an article in the ODONTOGRAPHIC JOURNAL headed "Observations on the Imperveousness of the Atmospheric," and find it duly credited at the tail-end to "Smith, in *Podunk Herald,*" he would know instantly that this particular "Smith" was none other than our old friend which his name it was "John." There's but one Beecher, you know,—and but one Smith.

OFF FOR EUROPE.

The many friends of Dr. W. C. Barrett, of Buffalo, will be glad to hear that he has "made the opportunity" and will go abroad about the 16th of this month. He sails in the Helvetia, and will visit persons and places of interest in England, Ireland, Scotland and France. Of course London and Paris will claim most of his time. He expects to return about September 1st. May he have a good time.

SQUIBS.

She wanted a set of teeth to "masquerade" her food.

It is said that from twenty to thirty members of the American Dental Association leave for Europe the 16th.

Hereafter the N. Y. State Dental Society will pubiish its proceedings in the dental journals—the proper place.

Dr. W. H. Keller, of Mexico, will soon issue the initial number of the *Bazar Mexicano.* This will be the first dental journal ever published in the Spanish language.

NECROLOGICAL.

In Geneva, Orange County, Florida, February 27th, 1881, Lansing B. Cook, D. D. S., in the the thirty-third year of his age.

We take the following appreciative notice from the *Dental Advertiser* for April:

"He commenced the study of dentistry in 1868, attended two courses of lectures in the Philadelphia Dental College, and graduated in 1871. In the early Summer of 1872, he came to Buffalo and entered upon the active duties of his profession, which he continued to discharge uninteruptedly until November last, when from impaired health and in accordance with the advice of his medical friends he relinquished his practice, and went to Geneva, Orange County, Florida, hoping to regain his health by spending the winter there, but died of consumption" as above.

"Dr. Cook was unmarried, but leaves a widowed mother, brothers and sisters together with a large circle of young friends and associates to whom his cheerful disposition and attractive manners had endeared him."

"He was a member of the Eighth District Dental Society of the State of New York. F."

OHIO COLLEGE OF DENTAL SURGERY.

By request of Dr. Betty, Secretary of the Committee, we make room for the following circular, to which the attention of the Ohio Alumni is earnestly invited:

Dear Doctor: CINCINNATI, April 25th, 1881.

At a meeting of the Alumni Association of the Ohio College of Dental Surgery, held March 3d, 1881, a committee consisting of five members of the Association, was appointed to prepare for publication a history of the college and of each alumnus, and such other matters as would be of interest to the Association.

The committee desire a complete history of the college from its organization; as complete as possible history of each alumnus, and biographical sketches of deceased alumni.

To this end the committee invite your attention to the enclosed list of questions, to which it is earnestly hoped you will take no exceptions and give a few minutes consideration at your earliest convenience, and forward to the Secretary, in order that the report may be as complete as possible.

N. S. HOFF, D. D. S.,
GEO. WATT, M. D., D. D. S.,
W. D. KEMPTON, M. D., D. D. S.,
C. I. KEELY, D. D. S.,
E. G. BETTY, D. D. S., Sec'y.
126 W. Ninth St., Cincinnati, O.

Name in full; place and date of birth; what, if any, literary institutions did you attend? where, when and with whom did you begin the study of dentistry? what other, if any, dental colleges did you attend? state the localities in which you have practiced, and your present location (give the time in each locality)? are you a graduate of medicine (state where and when you graduated)? of what dental societies have you been a member? what position of honor have you held in or out of the profession? what have you contributed to dental literature? married or single? can you give any facts concerning any deceased members of your class? give any facts of interest concerning the college, its faculty or alumni, in your possession, not contained in the above questions.

CORRESPONDENCE.

B. R. McG. sends the following:

In reply to your question, I have to say that my method of combining iodoform with eucalyptus oil arose from an emergency in which time was an important factor, and it has not been repeated. My experiment consisted simply in disolving thirty grains of iodoform in half an ounce of ether. After several hours, when the solution appeared to be complete, I added a half-ounce of eucalyptus oil, and after shaking the solution thoroughly, allowed the ether to evaporate from an uncorked bottle. I am convinced that the solution should be protected from light.

BOOKS, PAMPHLETS, PERIODICALS.

DENTAL CASE BOOK. By W. C. Barrett, M. D., D. D. S., etc., Rochester: Davis & Leyden. Pp. 147 (Double).

Case books have grown to be as much of a necessity to careful dentists as registers, day-books and ledgers. As a rule, they are made by the dentist himself from blank books picked up at the stores, and which of course contain no headings. To furnish suitable headings for these books is no small task—one that few willingly undertake, and that fewer still are qualified to perform. The " Dental Case Book " now before us is the best thing of the kind we have ever seen. The double page, the headings, the space alloted to each heading and to each case, seem to meet every possible requirement. Important matters only, as indicated by the headings, are given place; in other words, such only as are likely to be of permanent value, or when taken collectively furnish a ground-work for systematic study and practice. The " get-up " of the book is excellent—the heavy paper ruled in two colors, marbled edges, muslin sides and leather back and corners, making it at once handsome and substantial.

TRANSACTIONS OF THE OHIO STATE DENTAL SOCIETY. Fifteenth Annual Meeting, held at Columbus, Ohio, December, 1880. Published by order of the Society. Toledo, Ohio: Ransom & Randolf. Pp. 71.

Nearly one-half of this volume consists of a discussion of the ever-recurring and always-interesting subject, " sensitive dentine." It will occur to some who read the discussion, as it did to Dr. H. A. Smith, that the remarks of some of the members "appear like new revelations in histology and microscopy."

REPORT OF THE FIFTH ANNUAL MEETING OF THE BUFFALO MICROSCOPICAL CLUB. Published by the Club. Pp. 27.

This is an outline of the work of the club for the year. It contains but one paper in full, the address of the retiring president, Prof. D. S. Kellicutt.

THE POSITION THAT DENTAL AND ORAL SURGERY IS DESTINED TO OCCUPY IN AMERICA. By Truman W. Brophy, M. D., D. D. S. Chicago: Tucker, Newell & Co. Pp. 8.

DENTISTRY AND DENTAL EDUCATION—ITS PAST, PRESENT AND FUTURE, AS RELATED TO MEDICINE. By W. W. Allport, M. D., D. D. S. Chicago: Tucker, Newell & Co. Pp. 12.

This is Dr. Allport's after-dinner speech at the late banquet of the Alumni of Rush Medical College. He told the gentlemen present that "as medical colleges are now constituted, medical graduates go forth in as great, or greater ignorance of diseases of the teeth, than do dental graduates of general disease."

INJURIOUS EFFECTS OF VULCANIZED RUBBER. By L. P. Haskill. Chicago. Pp. 7.

DENTAL ALMANAC FOR 1881. An alphabetically arranged list of dentists practicing in Germany and Austria. Compiled by Dr. Adolf Peterman, Frankfort-on-the-Main.

Also copies of the Dental Almanac for 1877–'78–'79 and '80.

The current issue of this little volume contains two steel portraits, also a large amount of matter in relation to the Buchanan diploma business. The compiler has our thanks for these favors. We can appreciate the portraits.

SELF-CONFIDENCE AN ESSENTIAL ELEMENT IN THE CHARACTER OF THE IDEAL OR MODEL DENTIST. By Dr. Edgar Palmer. Lacrosse, Wis. Pp. 6.

A DIRECTORY OF THE DENTISTS PRACTICING IN THE STATE OF MISSOURI, Jan. 1st, 1881. Compiled by John G. Harper, D. D. S., Chicago, Ill.

The compiler will send copies on application. Dentists of Missouri are requested to send him notice of errors, changes, additions and deaths.

SYLLABI OF THE SEVERAL CHAIRS OF THE PHILADELPHIA DENTAL COLLEGE. (See page 45 for two of them).

THE MICROSCOPE AND ITS RELATION TO MEDICINE AND PHARMACY. An illustrated bi-monthly journal. Edited and published by Chas. H. Stowell, M. D., and Louisa R. Stowell, M. S., Ann Arbor, Michigan.

This is a very promising publication and likely to prove as interesting and instructive to some of our dental friends as to those who follow medicine and pharmacy. It is fully illustrated.

FOURTEENTH ANNUAL ANNOUNCEMENT OF THE BOSTON DENTAL COLLEGE, 1880–81.

We acknowledge the receipt of the following;

The *Dental Cosmos* for April, May and June; the *Missouri Dental Journal* for the same months; the *Independent Practitioner* for March and April; the *Ohio State Journal of Dental Science* for April and June; the *Dental Advertiser* and *Dental Headlight* for April; the *Dental Summary* and *Herald of Dentistry* for May; and the *Dental News* for May and June.

THE NEW JOURNAL.

Believing that it is never too late to say a good thing of a neighbor, we hasten to say what should have been said in our April issue, that the *Ohio State Journal of Dental Science* is the handsomest dental journal in the world (and we have seen them all), and that its contents are in keeping with its good looks. The "Editor's Specials" take us back to '66 and '67, when we first made his acquaintance through reading in the *Dental Register* of the doings of "Lord Oxygen" and "Lady Hydrogen." So far as we are able to judge, he hasn't changed a bit—and we're glad of it. The June issue brings with it a little circular which convincingly assures the actual and prospective subscriber that both editor and publishers mean business. One of these days we're going to steal something from it—we mean from its well-filled pages.

FILINGS.

Beecher says "we pray too much." This explains why the average dentist's breeches always bag at the knees.

That was a model conductor who stopped his train to enable the brakeman to find a set of false teeth that an old lady had sneezed out of the window.

Nitro-glycerine is coming into use as a cure for neuralgia. The patient is instructed to put a little on the door-step and then sit down on it violently. It cures.

The *Dramatic News* says: "Jones was going to the dentist's at a tooth-hurty gait," which is altogether tooth-in. It also says: "Castles in Spain is a 'nude departure.'" It gives us Spain to hear it.

It is said that there is an armless and legless printer in California, who sets up type with his teeth. A printer will set up with anything: we have one in this office who has been known to sit up with his girl.

"Little baby is very ill, Charley: I am afraid he is going to die." "Well, if he dies, he won't go to the bad place." "Why, Charley, how can you know that?" "Oh, I know he can't, he's got no teeth to gnash."

"When we are old, Claude, we shall still be lovers," she said, gazing into his eyes with the rapture of a gifted woman who writes poetry for the Boston papers. "The warm hues of our youthful affection shall never fade, but only grow brighter as we draw nearer to the sunset. We shall still sit out in the hush of the Summer eves and feed our souls on the poetry or the stars, shall we not?"

"Well, hardly," answered Claude, "unless you want me to remain up till daybreak basting your old back with arnica."

Then she bit off a fresh chunk of chewing gum, and the only sound that broke the silence was the crunching of her gold plugged molars.

THE
ODONTOGRAPHIC JOURNAL.

VOLUME II.—*October*, 1881.—NO. 3.

PROSPECTIVE ANNUAL ADDRESS.

BY A WOULD-BE PRESIDENT.

Gentlemen:—It is my duty as presiding officer of the————————————————————to welcome those of you who live "without the gates," to the place in which, according to the laws of this State, our annual meeting must be held, and all of you, not to the————————————as I had hoped, but to this apartment of our ——————————secured by our energetic Business Committee for the purposes of this, the twelfth annual meeting of our society, during the progress of which it will be the privilege, not to say duty, of each member to make the stay of others both pleasant and profitable. I therefore welcome you to what we have reason to believe will prove one of the most interesting meetings our society has ever held.

With these few words of greeting said, it devolves upon me to follow somewhat in the wake of my predecessors in office, in the presentation of an address that shall touch upon some things in the history of dentistry, more especially its recent history, or that for the year just closed. The thought is self-suggestive that a single year is short time in which to usher into practice matters of sufficient importance to justify me in taking your attention long, and such justification is almost wholly wanting in the face of the more specific and practical matters enumerated in the programme of this meeting, and which await presentation and discussion. And yet there are some things that seem to fall conveniently, if not properly, into the president's hands,—things that find a place for general consideration no where else, and which the "annual address," at best a desultory and "borous" affair, furnishes the only excuse for bringing to your minds at all.

As a matter of course *Operative Dentistry* claims consideration first, and in the present instance to the exclusion of everything else. This claim is natural enough, for operative dentistry is that department in which most of us take greatest pride, and success in which gives a man unqualified professional standing. Perhaps this ought not to be; but it is, nevertheless. I merely state the fact. It is my purpose here, however, to speak briefly of but one of the many phases of this most interesting and honorable branch of our calling.

For some years' past our societies, the country over, have given much time and attention to papers and discussions, and our journals much space to contributions, some for and some against what has come to be known as the *New Departure*, or to be more specific, the "electro-chemical" theory of decay in filled teeth. The gist of this innovation, as you may know, is an importation from England, where, in '62, '63 and '70, W. K. Bridgeman, L. D. S., read before the Odontological Society of Great Britain, the following papers: "On the Absorbtion of Bone and Dentine," "Pathology of Dental Caries," and "On the Electro-Chemical Action of Metallic Substances on the Teeth." These papers elaborated in a scientific manner the main features of the much talked-of theory of electro-chemical action as one of the causes of dental decay. But where first presented, aside from the award of a gold medal for the second mentioned paper, the theory fell dead. In this country it continued unknown till '74, when Palmer read before the state society a paper on "Chemical and Galvanic Action upon the Teeth," which contribution initiated the several series of papers and discussions that have appeared in our journals, and which, when taken together, constitute the bulk of recent American dental literature. I mean periodical literature, for the subject has not as yet assumed book form.

As presented by its first American advocate it was read and commented upon quite freely, partly because of its novelty, partly because of the consideration given it by our state society, partly because of the persistence of this advocate in forcing it upon the attention of the reading and convention-attending element of the profession. In time, Palmer was ably seconded by Chase, then by Flagg, and to-day, this trio is regarded as the embodiment of all that is great and good in the new teaching. Whatever the ultimate judgement of the profession as to the intrinsic merits of the theory in question, this much is certain: the names of its three great apostles will go down to our successors as of men of rare independence of thought and action, who created an interest in the electro-chemical theory of decay, compelled a hearing, inaugurated and maintained discussion, intensified the desire and determination to experiment, and to a greater extent perhaps than we may be willing to own, materially modified daily practice. For a time it looked as though gold had gone a begging, and as though the less highly-prized filling materials had suddenly and for all time greatly appreciated in value as to their tooth-saving properties. Everybody read, everybody thought, everybody experimented, everybody arrived in some way at conclusions. Some hastened to relieve themselves in convention, some in journals; some wrote recklessly, some cautiously, as if in doubt as to the correctness of their own conclusions; some looked on complacently, wondering where this thing would end; while not a few cursed these pestiferous fellows and their notions, and prophesied the downfall of modern dentistry and the starvation of all engaged in its legitimate practice. But modern dentistry still lives, and those engaged in legitimate practice are far more hopeful of the future than when the new teaching was first sprung upon the profession. Already there are signs of a decline in interest and in the desire to debate the question from the new departure side, and a greater activity, if not aggressiveness, on the part of those who, but a short time ago, were mum with madness. All this looks like a violent reaction whose watchword "nothing but gold," if carried to the same extreme as the teaching whose cry is "anything but gold," may keep us in as unsettled a condition for seven years to come as we have been for the same time just past. This augurs anything but immediate good for our calling, and is a state of affairs which those who have the good of the profession at heart have no more desire to see approved, than they have to witness the endorsement without qualification of the teachings of the new departure. Other materials *versus* gold may suffer transposition and become gold *versus* other materials. It is true that we knew much about gold seven years ago; it is also true that we know more to-day, thanks to those who have said so much and proved so little against it.

The thought is gradually assuming shape that the whole tendency of this question has been and still is in the direction of the ideal filling—a filling perfectly compatible with tooth-tissue. A near approach may be made to such a filling, but the thing itself is wholly beyond the reach of man, and must remain so till the conditions to which fillings are subject in the mouth have been accurately determined and their never-ceasing variations fully provided for. And at this point it may not be out of place to indicate what is deemed essential in this hoped-for filling: It must be easy of preparation and easy of introduction; it must look like the tooth as to color and translucency; it must be perfectly plastic and set within a reasonable time; it must contract and expand *with the tooth*, not otherwise; it must take a finish-like enamel; it must be no more soluable in the fluids of the mouth, no matter what their composition, than the tooth itself; and finally, when tested in acid and alkaline solutions in contact with tooth-tissue, it must give rise to no variations of the needle of the galvanometer. I think you will agree with me that though we are likely to approach this filling more closely than at present, its attainment is not even among the possibilities. And while it becomes us to make the best use of the various materials that have of late received so much attention,it will not do to discard nor relegate to a back seat,the material that has done such kingly service, not so much perhaps in the salvation of teeth, as in the indefinite postponement of their loss.

To return now to the main question we find, when looked at broadly, that this whole matter is nothing more nor nothing less than a spasm or convulsion of the body dentistry—surplus energy that has over-reached itself in its efforts to attain the impossible, and which might have done more harm had it gone another way. This spasm makes itself known at irregular intervals. The first occurred in '32, when amalgam, a bugaboo that has struck terror to many a good old soul,began to fall from the fingers of the Crawcours' into cavities that had else been filled with gold; the second in '55, when Arthur introduced that form of gold which has since become indispensible to him who would do his level best at filling; the third in '72, when the same distinguished gentleman published his "Prevention of Decay of the Teeth," which advocated the mechanical modification of the forms of the teeth, not only in cases of actual but also in cases of prospective decay; the fourth and last in '74, when our state society fathered the first American contribution to that theory of dental decay now described as Electro-chemical.

HISTOLOGY AND MICROSCOPY OF SECONDARY DENTINE.

BY I. C. CURTIS, M. D. S.

Read before the Fifth District Dental Society.

Before we can discuss the above named subject, it will be proper to investigate the histology and microscopy of *primary* dentine and bone. On examining a section of any bone, it is seen to be composed of two kinds of tissue, one of which is dense and compact in texture like ivory, the other consisting of slender fibers and lamillæ, which join to form a reticular structure. This from its resemblance to lattice work is called *cancellous*. The *compact* tissue is always placed on the exterior of the bone; the cancellous tissue is always internal. The relative quantity of these two kinds of tissue varies in different bones and in different parts of the same bone, as strength or lightness is requisite. Close examination of the compact tissue shows it to be extremely porous, so that the difference in structure between it and the cancellous tissue depends merely upon the different amounts of solid matter and the size and number of the spaces in each. The cavities are small in the compact tissue and the solid matter between them abundant; whilst in the cancellous tissue the spaces are large and the solid matter in smaller quantity. The intimate structure of bone, in all essential particulars, is identical in the compact and cancellous tissue, and is most easily studied in a transverse section from the compact wall of one of the long bones after maceration. The large round spaces are the Haversian canals, and in these canals the larger vessels of the bone ramify. The fine lines leading out of or into these canals are called *canaliculi*, and the irregular dark spaces which may be noticed, and which have a general circular arrangement around the Heversian canals, are called *lacunæ*. The concentric rings of lacunæ around each Haversian canal are called *lamellæ*. The irregular intervals which would be left by the juxtaposition of these lamillæ are filled up by lacunæ and canaliculi. The interspaces between the lacunæ and canaliculi are filled with a granular *homogeneous* solid material, the ultimate mineral base of the bone. In sections of thin plates of bone (as in the walls of the cells which form the cancellous tissue), the Haversian canals are absent; but when the thickness becomes at all considerable, Haversian systems begin to appear. Examination of the structure of the bone when recent has led Virchow to believe that the so-called lacunæ are really filled up during life with nucleated cells. It is by means of these cells that the fluids necessary for nutrition are brought into contact with the ultimate tissue of the bone.

The ivory or dentine of the tooth forms the principal mass. It is a modification of the osseous tissue, differing somewhat in structure and chemical composition. On examination with the microscope it is seen to consist of a number of minute, wavy and branching tubes, having distinct parietes. They are called the *dental tubuli*, and are imbedded in a dense homogeneous substance, the inter-tubular tissue. The dental tubuli are placed parallel with one another and open at their inner ends into the pulp cavity. They pursue a wavy and undulating course towards the periphery. The inter-tubular substance is translucent, finely granular, and contains the chief part of the earthy matter of the dentine. *Osteo-dentine* (or *secondary dentine* as it is called), is the name given to a substance found principally in old teeth, filling up the pulp cavity either wholly or partially. This structure partakes of the characters of dentine and bone, having canals surrounded by concentric lamellae-like Haversian canals. From these canals numerous tubules ramify in all directions in the same manner as the tubules of dentine.

In the early development of the tooth we will find the whole mass to consist of a gelatinous substance somewhat resembling a tooth in shape, with nerve filaments extending throughout its entire structure. At near the time of eruption a gradual hardening of the outer portion of the mass takes place,produced by the gradual deposit of calcarious matter at its periphery, embedding in its structure the nerve filaments radiating from the centre. This deposition of lime salts gradually takes place till we find the whole outer mass has become dense throughout its entire structure, with only the pulp left to furnish life to the tooth. And here let me digress to say that the nerve filaments embedded in the dentine appear to be obliterated, but in fact remain in a dormant condition, to be aroused at any time into activity by the proper stimulus, and such stimulus is presented when teeth decay under certain favorable influences. As for example, teeth of a poor structure undergoing rapid decay during a severe fit of sickness, or during pregnancy, producing what is termed sensitive dentine. There can be no sensation when there are no nerves to convey the impression. Hence we establish the proof that they only *appear* to be obliterated. The deposit of primary dentine is due to a natural stimulus which nature ever exerts to perfectly produce its kind.

Secondary dentine consists of a gradual and far slower deposit of calcareous matter, usually at the periphery of the pulp and point of stimulus. For we must bear in mind that after a tooth is developed, it requires an unnatural condition to produce a secondary deposit. The stimulus usually applied is found to be the gradual wearing down of the crowns so that the pulp is not nearly as well protected, and nature flies to the rescue to repair the breach; and well she does it, for we often find teeth whose pulps are entirely obliterated. This is the usual cause, but there may be others. A pulp nearly or quite exposed, capped over and filled, will sometimes make a deposit at that point. The following is a case in practice illustrating the fact that the same, or nearly the same cause does not produce always the same effect. A young man received a blow from a base-ball upon the superior central incisors, breaking both off near the lower margin of the pulp. Inflammation ensued resulting in the death and suppuration of one pulp and a complete calcification of the other. Hence we deduce the following: We must first have irritation which produces inflammation. Now if our inflammation is not of too violent a character we will obtain calcification. If not controlled we will have a breaking down of the tissues and the formation of pus. There can be no difference between calcification of the pulp and the calcification of the ligaments of a joint producing anchylosis. They both are the result of an inflammatory action. Osseous deposits can more readily be formed in a ligament with less danger of the breaking down of the tissues for this reason only: It has a comparatively less supply of blood and is of a lower grade of vitality.

THE PHILADELPHIA DENTAL COLLEGE SYLLABI OF STUDIES IN ANATOMY, PHYSIOLOGY AND SURGERY.

In the case of these syllabi, the hints to study are conveyed in the form of queries, merely for purposes of convenience and directness. It is, of course, to be understood, that the questions suggested have no reference whatever to any examination. The student is to learn of the various subjects what he can. Syllabi are simply aids to, not the accomplishment of, studies.

ANATOMY.

What is meant by the word skeleton? Of how many bones does a human skeleton consist? What is bone? What about difference of various kinds in bone at various ages?

Inform yourself concerning bone cartilage and inorganic materials; concerning the marrow, the cortical and spongy structures, the canals of Havers, the lacunæ; concerning processes, ridges, articular surfaces, foramina; concerning classification of bones into long, short, flat and irregular; concerning articulations, fibro-cartilage, ligaments, synovial membranes; concerning the mechanism of osseous movement.

Passing from generals to particulars, study the bones of the lower extremity; next those of arm and forearm; pass to pelvis, thorax; end with the head.

How many bones in the skull? How many pertain to the face? How many to the cranium? Which are irregular and which flat bones? What are the general characteristics of the maxillæ? What is the difference between maxilla and maxillæ? What is an alveolus? What alveoli? Does alveolar process vary in different bones? What are marked points about the various head bones? What could I tell of a frontal bone if asked about it? Can I describe to myself the features of a lower human jaw? What is the antrum of Highmore? Why is it so named? What is the maxillo-malar process? What has a turbinated to do with a maxillary bone? What forms the hard palate? What is meant by the greater and lesser wings of the sphenoid bone? Where is the true pelvis? Where is the false pelvis? Where are the tarsal bones? Where the carpal bones? Are the smallest toe-bones classed with short or long? What is the obstetric curve of the pelvis? What is the zygomatic arch? Where is the spheno-maxillary fossa? What bones enter into the composition of the nostrils? What is a Wormian bone? What is a suture? What is meant by an enarthrodial articulation? What is a ginglymoid joint? Do I know how the different bones of the face articulate with each other? Do I know how the orbital cavity is formed? Could I intelligently describe to a patient the manner of construction of the cranium? What is periosteum? What is pericranium? What is peridonteum? What is pericementum? What is peridentium?

What is a muscle? What are the uses of a muscle? What is the difference between muscles of voluntary and involuntary life? How are muscles related with the skeleton? What have muscles to do with flexion and extension of bones? How do muscles steady the skeleton? Why are muscles variously designated, as, for example, radiated, penniform, straight, quadrate, long, short, broad, etc.? What is the difference between the belly of a muscle and its tendon? What is muscular fibre? What of fasciculi? How does the muscle called levator labii superioris et alæque nasi get its name? Analyze the names of muscles generally. Try if you can group muscles, as, for example, into elevators, drepressors, rotators, etc. Acquaint yourself with the action, the origin and insertion, of the muscles of expression.

In what part of the body is the heart situated? What is its use? How many compartments has it? What is the office of an auricle? What that of a ventricle? Where does the right auricle throw its blood? Where does blood go after leaving the left ventricle? What is the pulmonic circulation? Does the pulmonary artery contain venous or arterial blood? What becomes of the descending aorta? How does the head receive its arterial supply? Where is the dorsalis pedis artery? Analyze the names of arteries. What is the composition of an artery? How many beats of the heart to a minute? What is meant by the term pulse? What is cardiac systole? What cardiac dyastole? What system of vessels return blood to the heart? How does blood get from an artery into a vain? Begin at the heart and trace the circulation to the feet; from the feet return the blood to the heart. Begin at the heart and carry the circulation to the teeth; from the teeth return it to the heart. What is meant by systemic circulation? Is there any period of life at which the auricles are related? Study the general system and names of blood-vessels. Inform yourself as to what is meant by capillaries.

What is meant by the term nervous system? What is the cerebro-spinal centre? What membranes envelope the brain and spinal cord? What are the hemispheres of the cerebrum? Where is the cerebellum? What is the common ventricular cavity of the brain? How many vertricles are there? What forms the roof of the common ventricular cavity? Name some of the parts constituting the floor of the brain. Work out the meanings of the convolutions and involutions. Acquaint yourself with the anatomy of the spinal cord. Learn the names of the cranial nerves. How do these names get out of the skull? How many spinal nerves? Why are they called spinal? What is a nerve of special sense? What is a compound nerve? What is a motor nerve? What is the difference between nerve-cells and nerve-fibres? Explain the carrying of a sensation from the upper part of a great toe to the brain. Explain excito-motor action. What is a ganglion? Study the general distribution of the nerves. Acquaint yourself with the sympathetic system.

PHYSIOLOGY.

What is physiology? What is life? What are the three great kingdoms of nature? What is the difference between organic and inorganic matter? What are the distinctions between plants and animals? On what does an animal's position in the scale of life depend?

Give the classification of animals? What is a division? Name the divisions of animals? What is a class? Name the classes? What is an order? Name the orders? What is a family? Name the families? What is a genus? Name the genera? What is a species? Name the species? What is a variety? Name the varieties?

What are the distinctive functions of each of the above?

What is the difference between accreation and growth?

What is an ultimate physical element? What is a proximate physical element?

What is a homogeneous liquid? What is a granule? What is a filament? What is a membrane?

How are cells formed? How do cells assimilate new material? What becomes of the old or formed material? How are worn-out cells cast from the body? What is a seed? What is an egg? Do all living things have their origin from a seed or an egg?

What is a function? What is absorption? What is secretion?

What is development? What is growth? What is maintenance?

Familiarize yourself with the above functions. What is dormant vitality? What is hybernation? What is sleep?

Study the above conditions and their distinctions. What is digestion? What is mastication? What is insalivation? What is deglutition? What is chymification? What is absorption? What is chylification? What is the circulation? What is nutrition? What is reparation? How are they performed in man?

What is sanguification? What is excretion? What is respiration?

How is heat generated in animals? How is motion produced in animals? How is electricity generated in animals?

What is sensation?

How are the movements of animals regulated?

What are the higher physical functions in man?

Describe the development of the epitheliums? Describe the development of the mucous membrane? Describe the development of the skin?

What are the characteristics of the teeth of herbivorous animals? What are the characteristics of the teeth of carnivorous animals?

What is dentine, and what its composition? What is enamel, and what its composition? What is cementum, and what its composition?

Describe the dentinal tubuli? Describe the enamel prisms?

Describe the pulp of a tooth?

How are the teeth nourished? What is the pericementum? What is periosteum? What is Nasmyth's membrane?

How are the teeth developed? What is a dental follicle? What is a dental sac? What is an odontoblast?

What is bone? Give the composition of bone? How are bones developed? How are bones classified? What is the cancellated structure in bones, and where is it located? What is the compact structure in bones, and where is it placed? Why are the long bones hollow and cylindrical? What is the shaft of a bone? What are the epiphyses of a bone? How are the bones nourished? How do bones grow? How do bones articulate?

What is an articulation? How many kinds of articulation are there in the human skeleton? What are ligaments, and what are their functions? What fluid do we find in movable articulations, and from what is it secreted?

What are muscles, and what are their functions? How are contractility and elasticity distinguished from each other?

What is the composition of saliva? On what food does the saliva act? Name all of the functions of the saliva?

What is mucus, where is it formed, and how secreted?

Where does the act of deglutition commence? What juices are found in the stomach, what is their composition, and on what foods do they act?

What is the duodenum, and what fluids are emptied into it?

What is the pancreatic juice, what its composition, and what its function?

What is bile, what its composition, and what its functions?

What are the names of the different parts of the small intestines? How many coats are found in it? What glands are found in each part of the small intestines?

Describe the changes that food undergoes in the alimentary canal? Where is the excrement, where derived, and how discharged?

Name the proximate principles or chemical bases of the animal body, and classify them. What are the various substances from which the above are formed?

From what substances are the various foods derived? Give the classification of foods? How should the various foods be prepared? What are the relative values of the different foods? How do foods differ in their effects upon man in health and disease, in youth and in old age?

What are the effects of starvation in youth, maturity and old age? Give the phenomena of starvation?

How is blood formed, and of what is it composed? What are the functions of the blood, and how are they performed? How does the blood carry nourishment to the tissues? How is blood purified?

What is the heart? How many cavities has the human adult heart? How many cavities are there in the fœtal heart? How many valves are there in the human heart?

What is an artery? How many coats has it? What is a capillary? What is a vein? How many coats has it? What are the functions of arteries, capillaries and veins? What is the difference between arterial and venous blood?

What is the systemic circulation? What is the pulmonic circulation? Describe the change the blood undergoes in the former? Where does this change take place, in the arteries, capillaries or in the veins? What change takes place in the blood while in the lungs?

How does the air get into the lungs? What is the mechanism of respiration?

What are the kidneys and what is their function?

Describe the route of the circulation of the blood to the teeth and return to the heart? Describe the route of the circulation of the blood to the foot and return to the heart? Describe the route of the circulation of the blood to the lungs and return to the heart? What are the lymphatic vessels, where do they begin and where terminate? What is the function of the lymphatics?

SURGERY.

Begin this subject by close reading on inflammation. Inflammation means simply perversion of circulation. The study is the most important that can engage the attention of the student. The cause of a perversion in circulation is found always in the presence of an irritant. There is never an inflammation without the presence of an irritant. The removal of an irritant is the cure of inflammation.

Study the meaning of irritation. How does an irritant provoke vascular perversion? Why does vascular irritability subside when an irritant is removed? How does an inflammation relieve a part of the presence of an irritant? What are the phenomenal expressions by which inflammation is recognized? What is simply vascular excitement? What is supuration? What is repair? What is serum? What is lymph? What is pus? Whas is the difference between a simple and a specific irritant? What is the meaning of a common cold? On what common principle is inflammation treated? What are the indications for treatment of an inflammation wherever situated? What is expressed by the termination "itis"? What is meant by resolution in inflammation? Study the principle of restoring equilibrium in perversion of the circulation. Study the action of blood-letting, of dry-cupping, of hot foot-baths, of counter-irritants, of cathartics, of diuretics, of diaphoretics, of arterial and nervous sedatives.

What is to be understood by the term tumor? How are tumors to be classified for diagnosis? Is a ranula a tumor? What is salivary fistula? Are ranulæ and fistulæ in any way connected? What is carcinoma? What is the difference between a histological and a clinical classification of surgical diseases? What is topographical or surgical anatomy? What means are employed for the control of hemorrhage? Where is the facial artery easiest of compression? How does one distinguish between arterial and venous bleeding? What is capillary hemorrhage? How is a bleeding alveolus controlled? What is to be done with a jetting hemorrhage from a wound in the cheek? What is to be done if one should luxate the jaw in extracting a tooth? How is luxation distinguished from fracture? What is to be done with a broken jaw? What is the difference between simple, compound and complicated fractures? Where does the facial artery come from? If the lingual artery should accidently be cut by the slipping of an elevator, how would the hemorrhage be controlled? Familiarize yourself with the surgical anatomy of the neck. How is an artery ligated? If a tooth should get into the trachea what is to be done? Acquaint yourself with the operation of tracheotomy. If a wisdom tooth had no room to erupt how would you relieve it? What is the difference between true and false anchylosis of the jaw? What is trismus traumaticus? What is tetanus? What is goitre? How would you diagnose goitre? What is meant by exsection of a nerve? How would you expose the inferior dental nerve?

HOW SCIENCE TORTURES HUMANITY.

The dental association has been in session the past week in Milwaukee. One doctor showed a new instrument that he had prepared from drawings that he had seen of instruments used at the inquisition, by which a patient could be taken by the hair of the head and jammed down in a chair, the feet being held in stocks, while a heavy weight was placed on the stomach. He claimed that in that position, with a gag in the patient's mouth, the condemned couldn't peep. He said he used the model of his machine on a woman who was nervous and timid, and it reassured her to such an extent that he knocked all her front teeth down her throat, pulled out her upper double teeth with a pair of ice tongs, and broke her jaw in two places, and when she got up she never said a word.

Another doctor explained a new method he had discovered of extracting the lower teeth. He said he put the patient in a chair that he had arranged so the head would be downward and the feet over a clothes bar. Then he drilled a hole into the under jaw from the outside till he found the root of the tooth, when he took a cold chisel and a mallet and drove the tooth out. Another doctor objected to this method on the ground that some patients who were a little sensitive might object to being stood on their heads, but the inventor of the idea said that could be obviated by bandaging their eyes as they sat upright, and turning the crank of the chair until they were inverted gradually, and they would think the toothache had turned their heads, but that they were right side up. A doctor from up north wanted to know if any of the delegates had struck anything that would take the place of gold as a filling. He was answered by another who said that while it was well to always charge for gold filling, by judicious management, such as twisting the neck of the patient so he could not see the filling that was used, you could smuggle in putty, or dough made of rye flour, which would soon harden. He said he had met with great success in using cracker crumbs to fill large cavities, and veneering the crown of the hole with plaster of Paris. He said the cracker crumbs, while they would become quite hard, could be easily dug out when he got the second job on the same tooth. One doctor wanted to know if it was considered right when he had the forceps on the tooth and was ready to pull, to take the patient by the throat with the other hand and choke him till his tongue run out. The convention decided that a dentist had a right to grab hold anywhere.—*New York Mercury.*

SYPHILITIC ALTERATIONS OF THE TEETH.

Parrot has devoted several lectures to the description of these alterations, described by some authors as being of convulsive origin, and by others as of a rachitic nature, whilst the author regards them as one of the products of hereditary syphilis. The following is a brief outline of the argument used by him to enforce his position: The typical alteration is found in the first molar, where it is constant if existing in other parts of the mouth. The altered part seems free in the middle of the teeth, and appears on a lower level than the sound part, from which it is separated by a sort of furrow. It is yellow, of an ochrey aspect; the cuspids are more pointed and filled with small elevations like grains of sand, and extremely friable. On the other hand, the part of the tooth upon which these altered parts rest is normal, often covered as if with a coat of enamel, The peculiarity of this alteration is the sort of retraction which the tooth has undergone at the same time, and which has given rise to the separation between the healthy and affected parts.

The cup-shaped atrophy, next described, may present itself alone or associated with other varieties. It is more particularly observed upon the upper middle incisors. The tooth is generally large and high, and on anterior and posterior face are observed small depressions of varying numbers—from one to eight. Their diameter does not exceed one millimetre, and they are in a horizontal row, united by small grooves or separated by a fold of enamel. At their level the tooth is not enamelled; it is of a dirty yellow, and the dentine is often exposed. This form of atrophy is very remarkable, and seems to be the elementary form of other varieties.

The third form is the sulciform atrophy. It is rarely found in the molars; it occurs chiefly in the incisors, and consists in horizontal furrows in numbers from one to three—rarely four—always horizontal and parallel near the maxillary border. A fourth variety is a hatchet-shaped atrophy. This is observed in the first dentition, only in the incisors, and almost always in the superior middle. This alteration is not primitive, being produced after the complete development of the tooth, whilst the other forms described commence when the tooth is still in its sac. The fifth variety is that to which Hutchinson has called attention, consisting of notches, occurring chiefly in the superior middle incisors, but being also found in others.

All of these varieties may be more or less considerably modified, but are almost always accompanied by certain consecutive alterations. First of all is the color, which may be modified, even in very careful persons, becoming yellowish or even greenish. In those exposed to different dusts, these attach themselves to the surface of the teeth, and give rise to various colors. There is also an abundant deposit of tartar. By far the most important consequent alteration is caries. The molars are lost early, the jaw is atrophied, and spaces, as normally seen in horses, are soon established.

There are, however, changes in the teeth which must not be confounded with those described. Thus, at the second dentition, the incisors often present at their free edges saw-like notches ; then it may occur that from friction the incisors may cut a bevel-edge on each other. The hatchet-shape may be determined by caries. And, again, there exists normally in some subjects true furrows. It is therefore necessary to be careful in making a diagnosis.—*St. Louis Medical and Surgical Journal.*

ABERNETHY ON TABLE-HYGIENE.

There are still, we believe, some apostles of rapid eating among the doctors in this country. We commend to their attention the following interview (from "Sam Slick"), which is worth a hundred lectures : "The Honorable Alden Gobble was dyspeptic, so he goes to Abernethy for advice. 'What is the matter with you ?' says the doctor. 'Why, says Alden, 'I presume I have the dyspepsy.' 'Ah !' says he, 'I see—a Yankee, swallowed more dollars than you can digest.' 'I am an American citizen,' says Alden, with great dignity ; 'I am secretary to our Legation at the Court of St. James.' 'The devil your are !' says Abernethy ; 'then you'll soon get rid of your dyspepsy.' 'I don't see that inference,' said Alden. 'But I tell you it does follow,' says the doctor, 'for in the company you'll have to keep you'll have to eat like a Christian.' It was an everlasting pity Alden contradicted him, for he broke out like one moon-distracted mad: 'I'll be d—d,' says he 'if ever I saw a Yankee that didn't bolt his food whole like a boa constrictor. How the devil can you expect to digest food that you neither take the trouble to dissect nor time to masticate ? It's no wonder you loose your teeth, for you never use them ; nor your digestion, for you overload it ; nor your saliva, for you expend it upon the carpets. You Yankees load your stomachs as a Devonshire man does his cart, as full as it can hold and as fast as he can pitch it in with a fork and drive off. And then you complain that such a load is too heavy for you.' "—*Medical Record.*

THE HUMAN FOSILE OF SCHIPKA CAVE.

A human jaw bone, found in the Schipka Cave of Moravia, along with bones of the mammoth and a number of rude stone implements, exhibits, according to a description given by Prof. Schaffhausen, of Bonn, some remarkable and suggestive peculiarities. It is a fragment, consisting of a fore part of the lower jaw, containing the cutting-teeth, the eye-tooth,and the two pre-molars of the right side. The last three teeth are still undeveloped in the jaw, but have been brought into sight by the breaking away of a part of the bone. The remarkable feature of the bone is its size. The development of the teeth is that of a child in its eighth year, while it is cutting its second teeth, but the proportions of the bone and of the teeth are those of a fully-grown person. The measurements of every part largely exceed those of similar parts in any child, and equally, in some points, surpass those of adults. Peculiarities were remarked in the shape of the fragments, as a retrocession of the lower part of the jaw, indicating the absence of a chin, and a very oblique slope of the hinder surface of the symphysis, as is observed in a higher degree in the anthropoids and in a lower degree in savage races and other fossils of men, such as the jaw of Nanette, with which this one has considerable similarity.—*Popular Science Monthly.*

HOW SYPHILIS IS COMMUNICATED.

But, even were it possible to obtain accurate information of the number of cases of venereal disease contracted in cities, it would give no indication of the actual injury to the human race by these diseases. It would take no account of the myriads of the happily still-born, and the feeble offspring who brings their taint into the world with them, after having diseased their mothers during their intra-uterine existence ; nor of those other myriads contaminated by mere contact with the infected who mingle in every crowd. Every one instinctively shrinks from the touch of the sufferer with smallpox, but how few realize that the syphilitic is a leper also to be shunned? How few mothers are aware of the danger to themselves and their children from nurses and housemaids drawn from a population in which every fifteenth person is diseased ? How few parents suspect the peril to their daughters from her accepted lover's kiss, who may be that one in every five young men among the better classes who has a venereal disease, which there is one chance in two is syphilis ?

These are not speculations. Gross has seen many cases communicated by kissing, and he tells of fifteen women, nine children and ten men diseased by a midwife who had a chancre on her finger, contracted in the exercise of her profession, and who had thus carried the disease from house to house.

Marion Sims says: "I have seen a cook and chambermaid with syphilitic ulcers on the fingers, and nurses infected by the children who had been born of syphilitic parents, in turn infecting sucking babes born of healthy parents, and I have known a drunken vagabond husband to contract syphilis in a low brothel and communicate it to his wife, who unwittingly gave it to her children simply by using the same towel and wash-bowl;" and one of your committee can add the case of an estimable and venerable lady who lost her eyesight this very year from using a towel in her son's room, carelessly left by him upon the rack, and another of a wife of a clergyman, who this summer sought relief at a Virginia spring for a horrible affection contracted in domestic contact with her servant.

The present Surgeon General of the navy, Dr. Wales, saw a number of cases of chancre of the lips among the smokers of one set of cheroots, of which the wrappers had been moistened by the saliva of a Manila cigar-girl, and at Beyrout he learned that it was not unusual for syphilis to be contracted by using a narghileh that had been pressed by the lips of a diseased smoker. Who would venture to eat the fig from Smyrna if he had seen the top layer of the choicest box pressed flat by the saliva-wetted thumb of a packer, who there was one chance in ten was syphilitic?

A member of your committee astounded an otherwise well-informed gentleman by explaining the risk he ran after he had been capsized in a river, in accepting the proffer of a flannel undershirt from a young man whose body was accidentally discovered to be spotted with a suspicious eruption.

A lady was equally alarmed when told by her husband, a physician, that she had invited to her table a young man, who, in the course of a physical examination that morning, had been found to have his mouth and tongue covered with mucous patches, and that her daughter was dancing in a public ball-room with another whose body was repulsive from syphilitic eczema.

A third invalid at a fashionable hotel had just settled himself in in bed, when the odor of tobacco on the pillow prompted an inspection, which revealed sheets which had not been changed, and which being a medical man, he quickly deserted, conscious that they might have shrouded a syphilitic predecessor.

An editorial in the *College and Clinical Record* of Philadelphia, of October 15th, states: "It happened to the writer to be recently called to see a man of most respectable surroundings, who bore an unmistakable venereal sore upon his hip, and subsequently manifested all the features of secondary syphilis. It was said that this had followed a trifling surgical operation of the part affected for the removal of a slight deformity; the instrument or the hands of the surgeon communicating the specific virus in the same manner. It will be remembered, that a New York dentist not long ago communicated syphilis by his forceps, and a well-known laryngologist inoculated a number of patients with pharyngeal chancre."

When the public knows by how many thousand channels this disease may assail them, your committee have no doubt that they will demand protection at any cost,and they urge upon this association the promulgation of the fact that so long as syphilitics are allowed to go unrestrained the spotless woman and the innocent child share the danger of contamination with the libertine and prostitute.

Let it be known that this fearful pest may be communicated by the blankets of the sleeping-car, the sheets, towels and napkins of the steamship, hotel or restaurant; by the hired bathing dresses of the seaside resort and the costumes rented for the fancy ball; by the chipped edges of a coffee-cup as seen at most hotels and eating-houses, and their half-cleansed knives, forks and spoons; by the public drinking vessel in the railway car, or station, as well as the public urinal or closet; by the barber's utensils, the brush and comb in the guest-chamber, the hatter's measure or the borrowed or sample hat; by the surgeon's or dentist's instruments, or the vaccinator's lancet; by the broom or dust-brush handled by a parlor maid, or by the spoon touched by the mouth of the cook or nurse; by the toys sold to children in the streets by venders with poisened lips or fingers; by play-cards and visiting-cards, which have been used, and especially by car tickets and by the paper money which circulates in a city where fifty thousand syphilitics are at large; by the loaned pipe, or cane, or glove; by the grasp of a friend's hand or the kiss of an accepted lover; by the son to his mother and sister; the husband to his wife and unborn child, and by the latter to its mother.

Were venereal disease restricted to those who seek illicit sexual gratification it might be well to let the guilty suffer and die: but when their sin is sure to leave upon them an ineradicable taint and to be transmitted to their helpless offspring; when, worse than all, the syphilitic leaves his stain upon whatever he touches to foul the chance passer—man, woman or child—as fearfully as if they have visited the vilest lupanar, it becomes the duty—the most important of all its duties—of this association to devise some plan for their protection.—Gihon, to *American Public Health Association.*

THE CHANCES OF THE DOCTOR.

There are in the United States 110 medical schools, having an annual attendance of 12,000 students, 3,000 of whom are graduated each year, and go forth to battle with life and competing M. D.'s.

This, associated with the historo-statistical fact that there are only about six hundred persons to each physician now in the United States, makes appropriate the inquiry, what are we to do? Taking into consideration the fact that some of the more fortunate of the profession have more than their *pro rata* of patrons, others must have proportionally less; and while this is well enough for the former, it is, to say the least, quite sufficient to produce a lack of *patients* to the latter; and patients are just as requisite to the doctor in the battle of life as is patience to any other class of mankind.

What can be done? Those before-mentioned more fortunate of the healing tribe have, by public patronage and praise, become, so to speak, bloated bond-holders of the profession, and are not willing to close and go forth to meet the honest granger and cheek him into buying a sewing machine, or subscribing for a book, although the idea has, among the greater part of the profession, been entertained that they were going to do something of the sort. But, from the present indications, it can safely be declared no go; and now something must be done. The trouble is not that we have too many doctor, but we have got too few—people. The doctrines of Malthus were promulgated in ignorance, and are not deserving of any credence whatever; they are incompatible with the statistics and the wants of the profession.—*The Arkansas Doctor.*

SECTION ON DISEASES OF THE TEETH.

The Section opened with an address from its President, Mr. Saunders, and an interesting paper by Prof. Owen, both of which we omit for the want of space.

The first subject propounded for discussion was that of

REPLANTATION AND TRANSPLANTATION OF THE TEETH.

Dr. Magitot described his method of replantation, and gave a record of ninety-two per cent. of successful cases. The general conclusion derived from the discussson which followed seemed to be that this operation should be adopted only when a tooth was otherwise in a hopeless condition, that the ends of the roots should be excised and smoothed, but that invariably successful results had been attained when sound teeth had been accidentally extracted and at once returned to their sockets.

An interesting summary of the experiences of Messrs. Clover, Braine, Bailey, and Coleman, read by the last-named, in the administration of anæsthetics at the Dental Hospital, Leicester square, since 1868, shows a total of more than 20,000 cases. Chloroform, gas, ether, nitrous oxide, and ethidene were given without a single fatality resulting from their use.

An important subject,

DENTAL SURGERY IN THE ARMY AND NAVY,

was brought forward, and it was strongly urged that a course of lectures on, with practical training in, the preservation of the teeth, should be included in the special subjects at military and naval medical schools, so that the health of our soldiers and sailors should not be endangered by the wholesale extraction of the teeth.

A question of much interest to dental surgeons was debated during the most of one morning—the causes and treatment of premature wasting of the alveoli and loosening of the teeth. Various theories as to the causes were advanced. The edges of the alveolar sockets were implicated in the disease, and there was no doubt that the only efficient treatment was to scrape away, with suitable instruments, not only all tartar on the teeth, but also diseased portions of the socket until healthy bone was reached, and, in addition, to paint these portions with phenylic alcohol.

Mr. John Tomes, F. R. S., read an essay on

DENTAL EDUCATION

which dealt most completely with the question, and was cordially accepted by the English, American and foreign representatives as the ideal system. Mr. Tomes pointed out that the preliminary examination in arts was the same for the license in dental surgery as for the membership of the College of Surgeons of England, and that whilst most of the subjects in the two curricula were also the same, where they diverged the difference was one of kind and not of degree, both costing the same in time, labor and money.

A subject of general interest was discussed in a joint session of the Sections for Diseases of Children and for Diseases of the Teeth, when Dr. Magitot read a paper on "Honeycombed Teeth as an Evidence of Infantine Convulsions." This produced a good discussion, and elicited from Mr. Hutchinson an expression of now well-known views about the teeth. He stated that the true syphilitic teeth could not be mistaken, the characters being most marked in the upper permanent centrals. The normal tooth when first cut had at its incisive edge the appearance of three denticles (described by Mr. Moon), but in the syphilitic tooth the middle denticle was absent, and this caused the tooth to appear pinched and conical. After twenty years' experience he stated that though only, perhaps, present in one case in five, these teeth were certain evidence of hereditary syphilis. Honeycombed teeth were simply defective in structure, irrespective of shape, and Mr. Hutchinson believed this to be due to mercury given in infancy, be it for syphilis or other disorder.

In the discussion on the influence of septic agencies in causing caries of the teeth, Mr. Underwood and Mr. Mills read notes on their experiments, and showed some specimens of carious dentine and cementum, in which the presence of bacteria and micrococci was distinctly and beautifully demonstrated under $\frac{1}{25}$ objectives. They found that they could produce apparent caries in teeth placed in meat solutions and kept warm, with abundance of bacteria and micrococci in the tubules and lacunæ, as well as in the fluid, which became acid, but that when other flasks and teeth were rendered aseptic by the usual methods, no caries was produced and no germs detected.

Other papers by Dr. Kingsley and Mr. Mummery, on the causes of the increased degeneracy of teeth at the present time, were read. The former stated that the increase of nervous disease correlated to deterioration of the teeth, each influencing, and in a measure, causing the other; whilst the latter imputed to the modern system of overstimulating the nerve-power by too early education a defective power of assimilation and tissue formation, especially of the teeth.

The treatment of irregularities of the teeth and jaws was dealt with by several writers, and Mr. Coffin's system of expansion was justly appreciated. Mr. Coleman explained the vexed question of erosion of the teeth as being entirely due to friction over degenerated portions of tooth-substance.—*Medical Record.*

PECULIAR PEOPLE.

The learned Doctor Beattie tells us of healthy, strong men who were always uneasy on touching velvet, or on seeing another person handle a cork; Zimmerman, the naturalist, of a lady who could not bear to touch silk or satin, and shuddered when feeling the velvety skin of a peach. One of the Earls of Barrymore considered the pansy an abomination, and the unfortunate Princess Lambelle looked upon the violet as a thing of horror. Scarliger turned pale at the sight of water-cresses, and neither he nor Peter Abono could ever drink milk. It is said of Carden that he was disgusted at the sight of eggs. We have heard of a valiant soldier fleeing without shame from a sprig of rue.

An author tells us, that provided he had a sword in his hand, he would rather encounter a lion in the deserts of Arabia than feel a spider crawling on him in the dark. William Mathews, son of the Governor of Barbadoes, had, like the above, a great aversion to the harmless spider. One day the Duke of Athole, thinking his antipathy somewhat affected, left him and his friends in the room, and came back with a closed hand. Mathews thought he had a spider concealed there, and becoming furious, drew his sword, and would have done damage to the duke or himself had not friends interposed.

We hear from the philosophic Boyle that the sharpening of a knife or the tearing of brown paper never failed to make the gums bleed of a servant he once had. Chesne, secretary to Francis I., always bled at the nose on seeing apples; a gentleman in the court of the Emperor Ferdinand had the same indisposition on hearing a cat mew. In the *Universal Magazine* for October, 1762, we read of a woman who on handling iron of any kind was immediately bathed in perspiration though never otherwise affected in this way. There is also related an account of a young woman at Schelestat, Germany, who for sixteen years had such an aversion to wine that she could not touch anything of its nature without prespiring profusely, though she had previously been accustomed to drink it. John Pechman, a learned divine, never heard the floor swept without being immediately uneasy, and feeling as though he were suffocated. He would run away or jump out of a window at the sight of a brush, the association with it and the noise was so intolerable.—*Lady's Journal.*

REMEDIAL EDUCATION.

In all but the vilest creatures the love of freedom is as powerful as the instinct of self-preservation; the anti-naturalists inculcated the dogma of implicit submission to secular and spiritual authorities. The experiment was tried on the grandest scale, and the result has demonstrated that blind faith leads to idiocy, and that absolute monarchs must be absolutely abolished.

The testimony of our noses justifies the opinion that fresh air is preferable to prison-smells; the anti-naturalists informed us that at various seasons of the year, and every night, the out-door atmosphere becomes mortiferous, and that sleepers and invalids ought to be confined in air-tight apartments. We believed, till we found that the most implicit believers got rotten with scrofula.

Animals seem to live and thrive on the principle that palatable food recommends itself to the stomach, and that repulsive things ought to be avoided. The anti-naturalists reversed the maxim, and assured us that sweetmeats, uncooked vegetables, cold water, drunk when it tastes best—*i. e.*, on a warm day—raw fruits, etc., are the causes of countless diseases, and that the execrable taste of a drug is not the least argument against its salubriousness. During the middle ages parents used to dose their children with brimstone and calomel, "to purify their blood," and, for the same purpose, the most nauseous mineral springs of every country are still pumped and bottled for the benefit of invalids. There is not a poison known to chemistry or botany but has been, and is still, daily prescribed as a health-giving substance, and, in the form of pills, drops or powders, foisted upon a host of help-seeking invalids. But, since the revival of free inquiry, we have compared the statements of ancient historians and modern travelers, and it appears that the healthiest nations on earth have preserved their health on the principle that guides our dumb fellow-creatures, and would guide our children if they were permitted to follow their inclinations. An overwhelming testimony of facts has proved that the diseases of the human race can be cured easier without the poison-drugs—easier in the very degree that would suggest the suspicion that every ounce of poison ever swallowed for remedial purposes has increased the weight of human misery. And the same suspicion is forced upon us by very cogent *a priori* reasons. If the testimony of our senses helps us to select our proper food, and warns us against injurious substances, have we any reason to suppose that such salutary intuitions forsake us at the time of the greatest need—in the hour of our struggle with a life-endangering disease? Shall we believe that at such times our sense of taste *warns us* against salubrious substances? And does it not urgently warn us against ninety-nine out of a hundred "medicines"? Shall the sick believe that an all-wise Creator has staked the chances of their recovery upon the accident of their acquaintance with Dr. Quack's Quinine Bitters or Puff & Co.'s Purgative Pills? Yet, is it possible to mistake the analogy between the remedial theories of our nostrum-mongers and the alleged moral "plan of salvation"? Is not the key-note of the Semitic dogma mistrust of our natural instincts and reliance upon abnormal remedies—mummeries, mysteries and miracles?

Poison-mongers, physical or spiritual, will cease to be in request whenever their customers begin to suspect that this world of ours is governed by laws, and not by special acts of intervention; that sickness can be cured only by conformity to those laws, and not by drugs and prayers—*i. e.*, anti-natural and supernatural remedies. To the children of Nature all good things are attractive, all evil repulsive: the laws of God proclaim and avenge themselves; the Author of this logically-ordered universe can never have intended that our salvation should depend upon the accident of our acquaintance with the dogmas of an isolated act of revelation; and, as surely as the germ of hidden seed-corn finds its way through night to light, the unaided instincts of the lowliest would guide him safely on the path of moral and physical welfare.—Oswald, in *Popular Science Monthly*.

A NEW GASEOUS DISINFECTANT.

Peyrusson has communicated to the Academie des Sciences the result of a series of experiments made with the fumes of nitrous ether. From these it has been demonstrated that they possess a most manifest disinfectant and anti-putrid action.

In addition to the trials made within the laboratory, it has been employed in the hospitals of Limoges. This agent has successfully purified the wards. It has also been used to preserve cadavers.

This ether offers another advantage; its odor is mild, agreeable and entirely inoffensive.—*Monthly Review of Medicine and Surgery*.

CANNIBAL SCOTCHMEN.

When Scotland had a climate very much like that of Canada to-day, when the Hebrides boasted great forests of immense trees, and when, too, a man could have walked on dry land from Edinburgh to Stockholm, the primitive Scotch-folk were as peculiar in habit as in head. The skulls of this period, which are still occasionally dug up, all belong to what is characteristically called the "boat-headed" type, and the good people who owned them indulged in a variety of savage practices, from having a community of wives to eating their own children. Professor Owen says: "The lowest skull in the Caithness series of an ancient stone-period resembles that of a West Indian negro." He also found a child's jaw "which had been broken for its dental press, not gnawed by beasts, and concluded the race to be cannibals." Little wonder after this that one scientific observer asserts the antique Scotch skull "is far more animal-like than those of any European race either known in history or hitherto discovered in prehistoric tombs of the iron, bronze, or later stone periods." There is something almost humorous in the contrast thus presented between modern Scotland—demure and devout—and the old, old Scotland where a kind of unutterable savage was in the habit of rampaging about, combining wholesale Mormonism with the delectable habit of feasting upon cold baby. Professor Huxley goes so far as to link these primitive ancestors of Sir Walter Scott and the Marquis of Lorne with the Australian Maories, but they were so interior to the latter that they had no sense of ornament, not a single fragment of bead or bracelet belonging to these dim ages having ever been found all Scotland through. Almost depressing is the idea of a people who belonged to so debased and low a type of humanity. One comfort lies in the fact that they lived a long time ago, when Glasgow was the site of a sea, and what is now the bed of the German Ocean did not contain water enough to have filled a teacup.—*Lady's Journal.*

FROM CARTILAGE TO BONE AS SEEN BY THE MICROSCOPE.

The change from cartilage to bone is a process which is understood, and, I may say studied, by but very few physicians and surgeons of this country.

It is a process of much importance, as it begins in the embryo and ends only when death ends every function of the body. There was no close study of the change until within the present century, and then owing to the poor facilities the study was incomplete and some of the most important conclusions erroneous.

It is only within a few years that the correct conclusions have been arrived at. For many years those studying developing bone, owing to their poor facilities, supposed that cartilage cells became directly transformed into bone cells; but this is not the case. I will, I think, safely say that the cartilage cell directly has nothing to do with the formation of the bone cell. The bone cell is an independent formation owing, as I have said, nothing to the cartilage cell. I will make my paper of as few words as possible covering the subject.

The first step of the change is the development of small capillaries and blood-vessels within the substance of the cartilage. Now begins the breaking down of the cartilage substance and cells. Owing to the metamorphosis of the melting cells we have formed blood globules, fat cells, marrow cells, connective-tissue cells, pus cells, etc. The points of development of the blood-vessels appear as small round reddish masses, but under the microscope these masses are found to be the blood-vessels filled with reddish brown cells destined to take an active part in the formation of bone substance. By careful observation with high power, small cavities are found within the ruptured cartilage capsules lined with small cells resembling epithelium. These are, or are to become, the so-called osteoblasts. It is from these osteoblasts that the deposition of the basis substance of the bone tissue takes place, in an outward direction.

By more careful examination cells of the osteoblasts may be seen pushing their way in the cartilage substance to become centers of ossification. That the bone cells are found within ruptured cartilage capsules is a settled fact and here arises the question as to the unruptured capsule having within themselves bone cells. I hope that at no late day this question will be settled. I have made a careful study of the subject and have never seen the cells in unruptured capsules. After the bone cells enter the cartilage substance the development continues as in other tissues of the body.

The study is an undertaking which requires much hard work, and is accompanied by many failures which necessitate the repetition of many parts of the work. One discouraging feature of the work is the fact that no permanent mounting can be made.—Lobdell, in *The Microscope.*

SENSITIVE DENTINE.

One of the best means of overcoming this is by the application of the rubber dam. As a rule the *lighter* the color of the decay the *greater* will be the sensitiveness. If several cavities in the teeth are to be prepared for filling, and one is found more sensitive than another, begin work on the *least* sensitive after having applied the rubber dam. If *absolute* alcohol be applied to the sensitive cavities on a small bit of spunk or cotton, and left *in situ* until entirely evaporated, and the preparation of the insensitive cavity be accomplished, and even until entire filling with gold or other filling material, considerable absence of pain in the cavities thus treated will be found to have ensued. The cause of this is in the complete dryness that is induced, as well by application of the dam as by the application of the absolute alcohol; for as this (the alcohol) has a very great affinity for water, it robs the dentine of some of its natural moisture, and leaves it almost as dry as dead bone. If, on attempting to excavate, sensitiveness is still present, a little chloroform applied on a bit of spunk to the cavity will genarally obtain an almost total immunity of pain. It may be, however, that the chloroform will effect only a certain depth of the sensitive dentine, so that several applications of the chloroform may have to be made before the cavity is of proper shape for the introduction of the filling. We know of no treatment so efficacious as this. Absolute dryness seems to be the best treatment, and this can only be obtained by means of the rubber dam, and the great affinity which alcohol has for water, and thus drying out the cavity to be excavated and filled.—*Dental Office and Laboratory.*

CONDUCTORIAL.

THE BOGUS COLLEGE.

The Wisconsin Dental College, at Delavan, Wis., has undoubtedly received within a given time, more gratuitous advertising in dental journals than all other colleges (assuming this to be a college) have received in the whole course of their existence. Of course it was not just the kind desired, but it nevertheless served to bring the institution into notice. The action of the Wisconsin State Dental Society in kicking into the street all in any way connected with the concern was well calculated to meet the approval of all decent people, and prevent, partially if not wholly, the further sale of Morrison's worthless skins.

CORRECTIONS.

On page sixty-three of our July number, in a notice of "A Directory of the Dentists Practicing in the State of Missouri," we gave Dr. John G. Harper's address as "Chicago, Ill." This was an error, for the doctor writes us that his address is "St. Louis, Mo." Readers will correct accordingly. He also writes us that he has made a number of additions and changes in the directory, a revised edition of which will be issued in 1883.

Another error is corrected in the following letter from Prof. Frank Abbott:

"In the July number of the ODONTOGRAPHIC JOURNAL, on page sixty, under the heading of 'Squibs,' the following statement is made, viz: 'Dr. W. H. Keller, of Mexico, will soon issue the initial number of the *Bazar Mexicano.* This will be the first dental journal ever published in the Spanish language.' I have before me now the '*El Progreso Dental,*' a journal published in Havana, Cuba. It has reached its seventh number of volume II."

SQUIBS.

Wanted.—A copy of No. 1, Vol. I, of the *Wisconsin Dental Argus.*

Dr. G. C. Daboll, who has spent the past year in Paris, is again at home in Buffalo.

Charles A. Spencer, of Geneva, N. Y., well-known to microscopists as a manufacturer of first-class objectives, is dead.

Delegates to the I. M. C. are still in doubt as to the difference between the English melon and the American squash.

Dr. John W. Pritchard, of London, was in Rochester a few days last month on a flying visit to some of his old friends.

A plain spoken purchaser of one of Snow's saliva ejectors, wrote the firm as follows: "The spitsucker is a daisy. Yours, etc.————"

Most of the American Dental Association delegates to the International Medical Congress have returned. They report a good time.

The Seventh and Eighth District Dental Societies hold their annual union meeting the last Tuesday and following Wednesday of this month, at Buffalo.

Prof. J. P. White, president of the medical department of the university of Buffalo, died the latter part of last month. He was seventy-one years of age.

Messrs. Davis & Leyden have our thanks for a well-preserved copy of that rare old book, "The Anatomy, Physiology and Pathology of the Human Teeth," by Paul B. Goddard, M. D. etc.

Elsewhere the reader will find a circular issued by a committee of the State Society in the interests of qualified dentistry. All cases of violation of the law requiring registration should be reported forthwith to the chairman of the committee.

The *Sentinal-Review* of Woodstock, Ont., contains a pleasant notice of the ODONTOGRAPHIC JOURNAL, which suggests the name of our old friend Southworth, formerly of Niagara Falls. We have looked the sheet through for his name, but in vain. He always was modest.

Perhaps the most extended tour made by any of America's representatives at the I. M. C., was that of Dr. W. C. Barrett, of Buffalo. The doctor "took in" England, Ireland, Scotland, Holland, Belgium, France, Germany and Switzerland. He is fully satisfied that "America is God's country, and no mistake." "Katie, you can cook better than all Europe."

We clip the following from a local newspaper: "Dr. E. Lloyd Howard, a prominent physician of Baltimore, in charge of the quarantine hospital, in attempting to jump from a steam tug to the wharf, yesterday morning, fell into the water and drowned."

Dr. Howard was professor of chemistry and materia medica in the Baltimore College of Dental Surgery. An effort to obtain particulars was not successful.

BOOKS, PAMPHLETS, PERIODICALS.

BACTERIA: THE SMALLEST OF LIVING ORGANISMS. By Ferdinand Cohn, Professor in the University of Breslau. Translanted by Charles S. Dolley, Student in the Medical Department of the University of Pennsylvania. Pp. 30.

In translating and publishing this excellent monograph of Cohn's, Mr. Dolley has done himself great credit. We commend it to all interested in the subject, and particularly to those who heard Dr. F. Y. Clarke's paper before the New York Odontological Society, or have since read the paper and discussion as published in the *Dental Cosmos.* We bespeak for the translator many complimentary notices, and for the pamphlet an extensive sale.

ORAL ELECTRICITY AND THE NEW DEPARTURE. By Dr. John J. R. Patrick. Read before the American Dental Association, etc. Pp. 20.

CONDENSED PRICE LIST (ILLUSTRATED) OF "ACME" OPTICAL GOODS. John W. Sidle & Co., Lancaster, Pa.

This is the firm that makes the microscope stand so highly recommended by Prof. J. Edwards Smith. And it's a good one.

A DIRECTORY OF THE DENTISTS PRACTICING IN THE STATE OF GEORGIA. By Geo. W. H. Whitaker, Sandersville, Ga.

A DIRECTORY OF THE PRACTICING DENTISTS IN THE STATE OF TENNESSEE. By Henry H. Morgan, M. D., D. D. S.

ANNOUNCEMENTS FOR 1881–2. Dental Department of the University of Pennsylvania; College of Dental Surgery of the University of Michigan; Baltimore College of Dental Surgery; Philadelphia Dental College; Pennsylvania College of Dental Surgery; New York College of Dentistry; Missouri Dental College; Royal College of Dental Surgeons of Ontario.

We acknowledge the receipt of the following since our last issue: The *Dental Cosmos* for July, August and September; the *Missouri Dental Journal* for the same months; the *Independent Practitioner* for June; the *Ohio State Journal of Dental Science* for August; the *Dental Jairus* for July, August and September; the *American Journal of Dental Science* for June and August; the *Dental Register*, *Dental Advertiser* and *Dental Office and Laboratory* for July; *The Microscope* for August; the *College and Clinical Record* for August and September, and the *Medical Record* (weekly) for July, August and September.

TO WHOM IT MAY CONCERN.

At the last meeting of the Dental Society of the State of New York, the undersigned were appointed a committee with positive instructions to commence suits against violators of the dental law. It is therefore desired that all cases of persons who shall attempt the practice of dentistry without proper registration, of students in dentistry or others illegally registered during their pupilage, or without pupilage, and who shall attempt the practice of dentistry under shelter of such registration, of persons practicing dentistry under the pretended authority of a fraudulent diploma, or of unqualified persons who shall attempt the practice of dentistry under cover of the name of a registered dentist, be at once reported to this committee, together with the names of persons, their patients or others, who may be summoned as witnesses.

The committee will at once begin one or more such suits if they be properly presented or reported to them.

W. C. BARRETT, Buffalo.
H. P. SOUTHWICK, " } Com.
F. FRENCH, Rochester.

FILINGS.

Oscar Wilde is one-tenth poet and nine-tenths *assthete.*

The new kiss invented by Emma Abbott opens in front.

Puck says: The order of the knights of the goitre are principally found in Switzerland. Its members are all swells.

It is now time for green corn in the ear: like a scandal, it is in everybody's mouth, and everybody's mouth is stretched from ear to ear.

In Arabia they have no dentists and of course the old people can't eat much. We don't know what they would do were it not for gum Arabic.

Items of interest says: "Drilling into a tooth you suppose contains a dead pulp is no trifling matter. If the patient is *syphilistic*, it may produce necrosis of the jaw." Boo!

Now-a-days when we see a young man with his nose split, and four front teeth gone, we are unable to tell whether he is a professional base-ball player or an amateur bicycle rider.

The brighter lights of the Strakosch opera troupe gathered round them a few friends on Saturday evening for a quiet little supper. The talk turned on Max Strakosch's new baby.

"He's got a tooth," said a gentleman sitting at one end of the table.

"Max is very proud of his baby," said Miss Kellogg, who was sitting at the other end.

"Yes," said the other gentleman, still carrying out his own train of thought, "and he's got two more coming."

Miss Kellogg shrieked and dropped her napkin and her knife and fork, while the gentleman still further enlivened matters by insisting that his reference was solely to the teeth.

The following "good one" is told at the expense of a dentist located not far from Ovid. A young lady while under the influence of an anæsthetic had four teeth extracted. As she was a very handsome "subject" the dentist, who is an unmarried man, could not resist the temptation of stealing a kiss for each tooth. The young lady was not so much under the influence, however, as he thought, and decided to "be even" with him, and so, on arising from the chair said she had forgotten her purse, but would send the amount, $2, the next day by a friend. The following day the friend went to the office and presented the dentist with a bill from his fair customer in which she gave him credit for extracting four teeth, $2, and charged $1 each for the four kisses, and added, "Please remit the balance, $2." He paid the bill. Bet a dollar he wanted to do it all over again.

THE

ODONTOGRAPHIC JOURNAL.

VOLUME II.—*January*, 1882.—NO. 4.

PRESERVATION OF TEETH BY FILLING.

BY S. B. PALMER, M. D. S.

The science of tooth preservation by filling is based upon law. Nature does nothing by chance. Certain conditions, which it is important should be favorable, indicate specific treatment. The experienced operator intuitively observes some of the conditions essential to success, and does it perhaps without knowledge of principles or laws. It is not my present purpose to support nor discuss any of the controverted theories with which my name has been associated, this offering being simply the outcome of observations and investigations in my own practice.

WITHOUT A SYSTEM.

Dental progress is greatly retarded for lack of a system; in other words, proper adaptation of filling materials to the special conditions of the teeth to be filled. For instance, the analysis of teeth generally accepted is given as twenty-eight parts organic, and seventy-two parts inorganic or mineral matter, in one hundred. This we understand to represent teeth in a normal condition. Whether the analysis is absolutely correct or incorrect does not in the least change the basis upon which our practice is founded. Demand for filling implies that some portion of the surface of a tooth is exposed to the action of the oral fluids, which act with greater vigor upon the mineral elements at that point than upon others. Experience proves that such decay is arrested by excluding the corroding agents. The operation, when performed upon a normal tooth, unless the cavity is deeply seated, is essentially mechanical. The choice of material is so hedged about by circumstances and conditions that we can only touch upon facts, or what may be done scientifically. With this knowledge each operator can adapt his practice to the circumstances surrounding it. Normal teeth as already stated, when locally attacked by decay, may be preserved by any material which protects the exposed surface from further action. This fact supports the claims for gold, tin, or amalgam, alike, and no point is gained by argument upon the statement or proof of long preservation. But by comparison in other respects we all agree that gold stands pre-eminent. If teeth were always normal in structure, good operators would need no better material than gold, and failures would result only from defective manipulation, and all because it is established that average teeth, when properly filled with gold, will withstand the action of healthy oral fluids for a life time.

A SUBSTITUTE WANTED.

But teeth vary in structure and power of resistance until the natural order of proportion is nearly reversed, or until there is little more than fifty per cent. of the mineral element left—an amount too small to protect the organic portion from exposure to exciting fluids and consequent secondary decay. Again, there are teeth devitalized before the process of calcification is complete a condition depriving nature of all power to improve their structure. Adding this class to the above mentioned low grade and we have from ten to twenty per cent only of all teeth that may not be filled permanently with gold; and with proper temporary treatment ninety per cent of teeth requiring to be filled may be preserved with gold. This I have often stated. But with the average dentist the number of successful operations would fall far below these figures. Can we pay gold a higher compliment, or do greater honor to the skill that manipulates it? If this statement had not been made before, and been as often overlooked, we could hardly believe there could be any more mistakes. Standing as we do, upon a recognized gold basis, we cannot be indifferent to the fact that there is of necessity an increasing demand for a substitute for gold in cases where all would admit that gold *could*, and under ordinary circumstances *should*, be used. Stringency of laws will give us better educated dentists. Education of the people will create a demand for the preservation of teeth; but neither laws nor education can put money into the hands of the laboring classes to pay for gold in back teeth.

ROOM FOR CHARITY.

The highest standard in the use of the best materials can only be reached and maintained by superior skill in a select practice. Therefor we should exercise charity for those who adapt practice to surrounding circumstances. A critic has recently made the following statement in a dental periodical : "The truth is that no general principle can be laid down as the best filling for certain tooth conditions and structure ; after all, the best test is durability and age." Does this statement agree with your experience ? Must the young practitioner wait and experiment, as we have done, before he can know how to choose material for filling teeth ?

A REPORT CORRECTED.

Is there no science in the operation ? To save confusion let us take up some of the most prominent indications or conditions, and treat each separately under the laws that govern that particular case. We will divide the teeth requiring treatment into two classes, namely: those which had better be filled with gold; and secondly, those which would be preserved for a longer period by other materials. Not all of those which, under favorable circumstances, should be filled with gold can be so preserved. Inaccessibility, lack of skill on the part of the operator, and lack of means in the patient, are quite sufficient reasons in many localities why there need be a substitute for gold, even where gold is best. What have we for a substitute ? Tin and amalgam, and occasionally a combination of gold and tin. Tin on account of its waste in crown cavities cannot be regarded as a good permanent filling. Amalgam seems to be extensively used. It is not my purpose however to speak of this material except to correct the report to the American Dental Association at its recent meeting in New York, which conveys the idea that amalgams which do not tarnish, those containing gold, platinum, etc., are not as good to preserve teeth as those formerly used. This is an illustration of the causes of controversy growing out of misstatements and misunderstandings. The statement was given essentially correct, but the application was to another class of teeth, a class to be mentioned further on. For the class of teeth under consideration gold is best, and if the substitute is to be amalgam, that is best which most nearly approaches gold in resistence to oxydation, freedom from skrinkage, and that will withstand abrasion.

ENTITLED TO INSTRUCTION.

It often occurs that any amalgam would be objectionable; indeed some do not use it at all, in which case some other substitute than plastic fillings would be most desirable. For example, I received a call recently from a young graduate from a respectable dental college of the West, who had been instructed to use no amalgam, and that gold was the only material for permanent fillings. I could but admire his fidelity to the instructions, but have pity for his patients in their losses necessary to give him an education from experience. The college has a right to aim high, and even discard amalgam if it choose, but the graduate is entitled to instructions in substitutes for gold when that material should be for any reason excluded. One of the substitutes is gold and tin combined. As this combination may be used in place of either gold or amalgam, it will be considered in connection with the second class of teeth mentioned—those which need more than mere mechanical plugs. The indications for other fillings than gold are manifested in teeth of young patients at ten, twelve and fifteen years of age, where numerous approximate cavities appear in the incisors.

INJURIOUS EFFECTS OF CONDUCTING PLUGS.

Crown cavities often occur in the molars from imperfections in the enamel, but which do not come under the second class. Such teeth, otherwise well protected by enamel, may be safely filled with gold at any time after cavities have formed. The fact that the front teeth, upper and lower, decay so very early is proof that they are below the normal standard. In some cases there cannot be above fifty per cent. of mineral matter in them. The point I wish to make is that this low grade of teeth ought not to be filled with a metal such as is used for permanent fillings. While for the first class of teeth gold would be preferable, for the second it would be most objectionable when compared with tin; because among other reasons, the latter is not as good a conductor of thermal changes as gold. There are other reasons in favor of tin not necessary to mention at this time. The injurious effects upon this class of poorly calcified teeth, by any conducting plug, is first manifested by changes of temperature. The same principle is involved as with other tissues; stimulants may excite action and aid nature, while excess inflames, devitalizes, and thus leads the way to death and decomposition.

RE-CALCIFICATION.

The normal tooth when first filled may be subject to thermal changes for a time and then subside, and removal of such fillings will show a hardening of the dentine, which means increased resistence. Abnormal teeth subjected to severe changes receive little or no benefit from calcific deposits. The surface in contact with the plug looses its sensibility not by increased density, but by devitalization of the agencies which not only convey sensibility, but the lime element necessary to harden the dentine. The indications that such results are about to follow become apparent in a year or more after filling. Slight discoloration of the surface back of the plug is apparent ; reflected light thereon through the tooth shows that the walls are opaque. Whether such fillings will preserve the tooth or not depends upon the enamel border. If the joint is perfect the devitalized lamina cannot undergo rapid decomposition, and the filling may preserve the tooth for a considerable time ; but removal of such fillings will at once show a softened surface of dentine. Any leak around fillings inserted in this manner is sure destruction. It is this class of teeth that admits of circulation in the dentine. Opponents take normal teeth to refute the argument. It is not my design to discuss the merits of various fillings, but will say it is my practice to fill this class of teeth with gutta percha till nature prepares the tooth for gold, which may require from one to five years.

TIN AND GOLD-AND-TIN MOST COMPATABLE.

Another condition also places teeth in the same class—that of devitalization previous to complete calcification. Nothing but good enamel borders can protect such teeth from secondary decay around gold fillings. The antiseptic properties of tin and amalgam are due to chemical action upon the material liberating metalic compounds which are absorbed into the dentine and occupy the place of the mineral element found in normal teeth. The density of a tooth determines the amount of mineral or metalic matter it will receive. A good firm tooth will be discolored but little by a very poor amalgam, while a poorly calcified tooth will often appear very dark and unsightly. To avoid this it is my practice to line the cavity with oxyphosphate and protect it with the metal filling which many times may be gold. Cavities too shallow to receive such a lining may be lined with two thicknesses of tin foil and be finished with amalgam of the best quality. Tin, of all metals used for fillings, seems to be the most compatible, and at the same time does not discolor dentine like amalgam. In practice, I find some patients greatly prejudiced against amalgam, and others in whose mouths I would not wish to insert it. I am now speaking of back teeth of a structure too frail to admit of gold, and in portions demanding fillings more durable than is expected from the other plastics. The substitute which best answers the purpose of gold is gold and tin combined. This combination has long been used abroad. Some specimens of several years standing have come under my notice, also work of the kind done in New York, and my own as well. There are rules to be observed in the preparation of the material to secure the best results, which are here submitted for your trial. Gold and tin foil placed together in alternate layers and used as a filling material, is subject to changes under the following conditions: when used in cavities suitable for gold—that is, where the dentine is sufficiently dense to forbid circulation of moisture through the structure back of the filling, the plug will appear at the surface much the color of amalgam. In cutting into the plug, if well packed and dry at the time, gold and tin will be found mechanically combined, while the surfaces exposed to moisture will be found to have chemically changed, presenting much the appearance of gold and tin alloy and quite hard. If the plug is inserted wet the whole plug presents this changed condition.

CHEMICAL ACTION HARDENS.

The advantage of such fillings consists in a substitute for amalgam in cases where the latter for any reason would be discarded; besides it does not discolor the dentine and possesses the desirable properties of tin in rendering the dentine negative to secondary decay. This is not introduced as new. The conclusion arrived at from examination of the work mentioned is this: about equal portions of gold and tin should be used to avoid the rough and uneven surfaces presented by large plugs in long use. The hardening of the filling depends upon chemical action by which the two metals unite to form an alloy of gold and tin. This action depends upon moisture, because when fillings are dry and well packed the two metals remain distinct. The affinity is not perfect as when fused together, nor do they form an alloy, except the two metals are nearly in contact. This has been my observation: when more than one layer or thickness of tin foil came in contact, or in other words, if there is any considerable space between the layers of gold, the tin intervening will be dissolved by galvanic action, which leaves depressions corresponding to the wasted tin, hence it is not best to roll the gold and tin together into a rope, but place one leaf upon another alternately—four or six leaves making thickness sufficient for convenient packing. Cut from the sheets into blocks or strips—the cutting secures the edges so that the leaves remain together. In this form no two thicknesses of one metal come in contact. I think this precaution will overcome the objections mentioned above. I do not find it necessary to often use this combination for entire fillings unless there is objection to amalgam. Lining the cavity with tin will answer every purpose practically. It is most valuable as a foundation for gold fillings at the cervical walls, particularly approximate cavities in frail teeth. From a single layer to one-half the plug may be used in accordance with the condition of the tooth structure, the balance to be filled with gold.

THE ONE THING NEEDFUL.

One thing needed in practice is knowledge of the structure and conditions of the tooth to be filled, also the action of the materials used for fillings upon the dentine in its variour phases. Guided by such knowledge the filling of teeth is more than a mere mechanical operation, and it is not necessary to wait for age to test durability.

SYRACUSE, N. Y.

REVIEW OF "UNFORTUNATE INTERFERENCE" IN OHIO STATE JOURNAL OF DENTAL SCIENCE, AUGUST, 1881.

BY ONE OF THE FEW.

"Hast thou faith? have it to thyself before God. Happy is he that condemneth not himself in that thing in which he alloweth."

"Wad some power the giftie gie us,
To see oursels as ithers see us,
Twad frae mony a blunder free us—
And foolish notion."

* * * "Often the pulps of the permanent laterais are drawn out in this way, by their adhering to the roots of the temporary teeth. Not long ago a popular physician told us he had quite a curiosity to show us, and in our line of thought. Taking out a vial, he said, 'See here! I took out a tooth for a beautiful little girl the other day,

to make room for a new tooth; and look here is a curious little teat attached to its root.' And he showed us a temporary lateral, with the pulp of the permanent one attached to it. Maimed for life, was that beautiful little girl. There is not much excuse for such malpractice. We are not so much surprised that physicians forget, as that they presume to know when so dangerously befogged. Better far, had he cut off the little girl's finger. Let it be borne in mind that a temporary tooth is to be removed only to make room for its own successor. Let it never be extracted on any side issue. When physicians are not posted, they should refer all such cases to dentists."

The complacency with which some presume to teach the depth of wisdom and knowledge upon subjects of which they are as innocent as three months fœtuses, is to say the least remarkable.

The easy virtue of would-be-wise men who give credence to the mere babble of pretenders, is matter for an animadversion and illumination of the obtuseness with which they jump at conclusions that wont conclude. That an old fogy M. D. should make the mistake of not being able to recognize a product of the inflammatory process set up by the economy to rid itself of a part which had become offensive by having been deprived of normal blood and nerve supply, may not be an unheard of blunder; but that an M. D. *and* D. D. S. should forget that the "pyogenic sac" (in the old parlance), never could include the pulp-germ of a coming permanent incisor tooth, is so far from commendable as to call loudly to him to take a dose of his own prescription and study "the order of appearance in second dentition." It is needful to call to all, who are so careless in study or negligent of the facts of the case in every subject yet dissected and recorded, to the fact of the building of each socket of each tooth immediately about the germ-sac in which each tooth is developed; thus making it utterly impossible for any germ to "adhere" to the temporary tooth or root when extracted. Let those who wish to correct "unfortunate interference" not "interfere" when they are *novices* and not *masters*, as proved by the zeal in condemning others and allowing themselves to rush into fields unknown to them, and trodden only by the very few, so faithfully as to entitle them to deal damnation to those quite as innocent of the special knowledge involved as those these condemn. It is one of the rarities in histological embryology to find a tooth developed without a *bony cell* or sac in which it is calcified to render it useful as a cutter, tearer or grinder!

But that a tooth belonging to the secondary or permanent set has any vascular connection with the temporary or first set, yet remains among the unknown categories of anatomy, physiology and therapeutics—a notable M. D., D. D. S. to the contrary notwithstanding.

Let us have less trash and more facts to grace the pages of the "best dental journal" extant—or we shall go on groping as before its advent to illuminate the whole body.

THE LEGAL STATUS IN NEW YORK.

BY W. C. BARRETT, M. D., D. D. S.

In the last number of the ODONTOGRAPHIC JOURNAL was published a circular, issued and signed by the committee appointed by the State Dental Society to look after the enforcement of the dental law, which warned all illegal dental practitioners of the action which, by direction of the State Society, they were compelled to take. So many letters of inquiry have been addressed to the committee, and the labor of answering them has become so onerous, that it has been deemed advisable to comply with the request of the Conductor of the JOURNAL, and to publish to the profession of the State some account of the labors of the committee, their usual course of procedure when complaint has been made against a dentist, and what, it is hoped, may be accomplished.

In order to a clear comprehension of the present status, it is necessary that the history of the Act should be briefly rehearsed. At the annual meeting of the old Western New York Dental Association, held in Buffalo, in May, 1867, the late Dr. B. T. Whitney first broached the subject of a State Dental Society, to be made up of representatives from subordinate societies, established and supported by special legislation, and which should supplant the segregated and isolated small societies of the State. At the October meeting in the same year, Dr. Whitney had matured his plan. He presented it, and the writer of this, at that time Secretary of the society, was by vote directed to open correspondence with the officers and members of the several societies, and if possible secure their co-operation. Dr. Whitney assumed the direction of the matter, and through his influence and efforts the preliminary meeting at Utica, Dec. 17th of the same year, was held, and thus his right to be considered the parent of the Dental Society, and the originator of special legislation in this State, is indisputable. The plan was elaborated in his mind before any one else ever heard of it, and it was explained to the present writer before being presented in public anywhere, and before a whisper concerning it had been, so far as he knows, made by any one else. The credit of first moving in the affair has been given to others, and it is but justice that the truth should be put upon record.

At the Utica meeting Drs. B. T. Whitney, A. Wescott and L. W. Rogers. were appointed a committee to prepare and present before the legislature a proper dental bill, and their efforts resulted in the Act passed April 7th, 1868. This law was not in any way restrictive, and was only intended to organize and establish a State Society, although it was distinctly understood by those active in securing this much, that further legislation would in the fullness of time be demanded. It was deemed advisable to proceed with caution, knowing that, if a law was once upon the statute books, its amendment would be a comparatively easy matter.

April 21st, 1870, the legislature passed the first amendment, but this simply provided for the conferring of a special degree—Master of Dental Surgery—by the State Society, after due examination by the Board of State Censors. The intention was still further to prepare the way for a closer drawing of professional lines. At nearly all its succeeding annual meetings, the State Society in some way gave warning that the time was approaching when restrictive legislation would be asked, though it was the desire to avoid anything like haste. At the annual meeting in June, 1875, the President in his annual address recommended action, and the subject was duly considered, but finally postponed one year. In 1876, the same man, who had been re-elected President, again presented the subject, and a committee was appointed to draft and submit a proper bill. There was a difference of opinion as to the desirable provisions of the proposed law, and it was not until June 20th, 1879, that the present restrictive law was passed, making registration compulsive, and providing that thereafter none should enter upon the practice of dentistry who were not possessed either of the diploma of some reputable college, recognized as such, or that conferred by the State Society. After the sixty days allowed for the registration of those in practice at the time of the passage of the Act had elapsed, it was claimed in some quarters that sufficient notice had not been given, and that some dentists had not known of the existence of the statute until the time had passed when they were permitted to take advantage of its provisions. Accordingly no attempt was made to enforce the Act, and last winter still another amendment was presented to the legislature, extending the time for registration under proper restrictions, and providing that all dentists who should hereafter enter upon practice should record their names, office and post office address, together with their authority for entering upon such practice.

At the annual meeting of the State Society held in Albany, in May last, it was decided that sufficient warning had now been given, and that all had been allowed ample time to prepare for the enforcement of the law. More than thirteen years had elapsed since the passage of the original act of organization, and each succeeding year some action looking toward a final restraining Act had been taken. There had been differences of opinion as to the advisability of certain provisions, but now the reputable part of the profession seemed nearly unanimous in demanding action. The ground seemed all cleared for it, and there was no longer any excuse for delay. The society could certainly not be accused of precipitancy, and further procrastination would jeopardise the efficiency of the law by creating the impression that no efforts for its enforcement would be made, and that it was to remain a dead letter. Accordingly, a committee consisting of Drs. W. C. Barrett and A. P. Southwick of Buffalo, and Frank French, of Rochester, was appointed, and they were, by unanimous vote of the State Society, given strict instructions to commence prosecutions under the law.

In consequence of the absence of the chairman of the committee in Europe during the summer, nothing was done until his return, for as it was a momentous matter it was important that no mistakes be made, and none of the committee desired to move until all could act together. Upon the return of the chairman the committee at once issued the circular "To whom it may concern," which was published in the last number of this Journal, in the *Dental Advertiser*, and distributed throughout the state. This announcement was made only after careful consultation, and it indicated the course which the committee had determined to pursue. It was directed against four classes of persons :

First.—The old practitioners who were unregistered.

Second.—Students and others illegally registered.

Third.—Persons registering under a fraudulent or unrecognized diploma.

Fourth.—Illegal practitioners practicing under cover of the name of a registered dentist.

The committee determined to pay no attention to complaints evidently prompted solely by jealousy, or to those coming from anonymous or irresponsible sources. Accordingly, all cases were primarily referred to the State Censor for the district in which the accused resided. If he, or any officer of the State Society endorsed the complaint as being worthy investigation, the committee summoned the accused to show cause why suit should not be brought against him for violation of the law. He was invited to make a statement of his case, and to substantiate it with all the testimony which he chose to adduce. The committee gave him a patient hearing, and assured him it was their desire to ascertain the simple truth concerning his legal status, and that they had no interest whatever in making out a case against him. He was informed that when all the complaints in one district had been properly investigated, they would be submitted to the best legal counsel attainable, who would, after examining the supporting testimony, give a legal opinion as to the status of the dentist complained of. To such as he decided were in illegal practice due notice would be given, and they would then be invited to elect whether they would go before the Board of State Censors for examination, abandon practice in this state, or stand a trial. Great care would be observed that no oppressive measures should be taken, nor action commenced without due notice, but that against those who chose the latter alternative, or who declined within a reasonable time to do either of the former, suits would be brought and pressed to a decision. This seemed to us the only fair way of procedure. That the State Society did not intend to act vindictively its very forbearing course during thirteen years amply proved, and the committee simply desired to carry out the wishes of those who had commissioned them. This has, however, involved the committee in an immense amount of labor, which for obvious reasons has fallen mainly upon its chairman. He has been fully sustained by the others, but it was unavoidable that the correspondence and principal executive business should be in the hands of one man. The committee could not be called together to answer every letter that was received, nor was there always opportunity for consultation in emergency cases. Each has, however, done what he could to further the ends in view. The correspondence has been very large, and the time given to the examination of cases has too often been stolen from other imperative duties. Yet the committee believes and knows that its labors have not been without results. Of the many cases investigated, nearly all in the western districts, a part of the accused have established the legality of their standing, some have left the State, others have retired from practice, and a number are progressing towards a trial which, however, there is yet an opportunity to avoid by a compliance with the plain provisions of the law. There are a number of cases at this present writing (Dec. 1st), yet undecided. but before this number of the JOURNAL shall be in the hands of its readers, they will probably either have complied with the law, or will have been cited for trial in the courts.

In the course of the discharge of its duty the committee has fallen upon some curious cases. Perhaps the most peculiar one is that of John Jefferson Kesler, of Little Valley, Cattaraugus county. Complaint was made against him, and the committee wrote him, asking under what authority he was engaged in the practice of dentistry. Promptly came the answer, enclosing the certificate of the County Clerk of Cattaraugus county, that the accused had complied with all the provisions of the law, by filing in his office a diploma conferring the degree of "Doctor of Dental Surgery," issued by the Wisconsin Dental College, situated at Delavan, Wisconsin. His matriculation tickets were presented. *bearing the same date as his diploma.*

It may well be imagined that such a piece of assurance astonished the committee to the last degree, and they at once returned him the following

LETTER :

Sir:—We are in receipt of yours and hasten to reply. Your diploma is a fraud. It comes from an unrecognized source, and it is our purpose to prosecute the possessor and employer of every such disreputable document. We are very much surprised that you should have the assurance to hang up such a perpetual witness of your disgrace, and the sublime impudence to attempt to pass it off upon us as a genuine qualification for practice. We desire to talk plainly with you, and that you may feel assured that there is no personal feeling in this matter, we first of all declare that we are acting as the rather unwilling instruments of the New York State Dental Society, to which we must make report of all that we do, and furthermore that, personally, you are an entire stranger to us.

The law makes special provisions for the punishment of those who attempt the use of a fraudulent diploma. You must *know* the character of the Wisconsin institution. You know that you attended no lectures and pursued no curriculum of studies. Scarce a dentist in this State failed to receive one or more of those infamous and insulting proposals to *sell* to him a diploma which could convey nothing but opprobrium and disrepute. Among professional men there is no act which is held in such general and utter detestation as the acceptance of one of these fraudulent papers. Yet you have the effrontery to send to the committee of the State Dental Society having in charge the enforcement of the law, that disreputable document as an evidence of your regular practice, and to present a certificate that the scandalous thing hangs upon your office walls. Shame upon you! That Delavan diploma mill is denounced by all respectable men, and will meet the fate of its Philadelphia prototype, whose infamous proprietor, Buchanan, is now in penitentiary, and whose patrons and so-called "graduates," would gladly give large sums to be delivered of the odium connected with their disgraceful purchase.*

"Though the mills of God grind slowly, yet they grind exceedingly small," and despite the delays of the law, the conductors of the so-called Wisconsin Dental College shall yet reap their reward in a Wisconsin prison. You paid twelve dollars for your *diploma*, and claim it as sufficient authority for you to enter an honorable profession. You desire to profit by this knavery, and in turn to perpetrate the imposture upon those who may be so unfortunate as to patronize you; but you will yet discover that a better policy would have been common honesty. Our duty in the matter is plain:

First.—Suit will be begun against you as soon as possible.

Second.—The State Committe consider it their bounden duty to guard the people of Cattaraugus county from imposture, by informing them what is the character of the diploma which you are endeavoring to foist upon them as reputable. The man who will deceive them as to his legal qualifications cannot be trusted in any professional relation whatever.

Third.—The committee will also feel itself obliged to notify the profession that there is, to their astonishment, one man who has disgraced himself and dentistry by buying one of these dirty things, and has even had the hardihood to offer it to regular dentists as evidence of professional standing.

Fourth.—We desire to assure you that this filthy document, so far from forming a legal qualification, is of itself proof of fraudulent practice, and will be cited in evidence.

There is a bare possibility—and from the exceeding *freshness* with which you offer us this document, perhaps something more—that you do not realize the enormity of your professional misconduct, and do not know how an unearned diploma is viewed by professional men. If this be the case, and you desire to retrace your steps, you will first of all wash your hands of this shameful thing, and go before the State Board of Censors for a legal examination. Should you desire so to do you can at once notify us, when we will give you a reasonable time for its accomplishment. But the fraudulent paper must be first of all surrendered *to us*, for return to those who issued it. In the meantime we shall be collecting the necessary facts and evidence, aside from the diploma, upon which to carry on the suit.

---

* Buchanan and Paine sold diplomas purporting to be issued by the Pennsylvania Hospital; Ecclectic Medical Institute, Cincinnati, Ohio; Livingston University of America; Ecclectic Medical College of Pennsylvania; National Ecclectic Medical Association; American University of Philadelphia; and a number of other bogus institutions, purporting to be located either in this country or in Europe. Some of them, like this Delavan affair, were organized under a lax general law, but like it were conducted by unprincipled, ignorent men, whose sole object was to make money by selling their disgraceful diplomas.

[Signed by the Committee.]

The prompt answer to this letter was, that the accused was ready to obey the law, and would soon visit the committe and comply with their demands, but in a few days they received information that he had left for parts unknown. It is believed that there are others of these disgraceful "diplomas" in existence in this State, concerning which the Committee desires information, with a view to prosecution to the full extent of the Law.

BUFFALO, N. Y.

THE PHILADELPHIA DENTAL COLLEGE SYLLABI OF STUDIES IN CHEMISTRY AND MATERIA MEDICA.

In the cases of these syllabi, the hints to study are conveyed in the form of queries, merely for purposes of convenience and directness. It is, of course, to be understood, that the questions suggested have no reference whatever to any examination. The student is to learn of the various subjects what he can. Syllabi are simply aids to, not the accomplishment of, studies.

CHEMISTRY AND MATERIA MEDICA.

Get a definite idea of chemical affinity or attraction. What is chemistry? How may we classify all matter?

What are chemical symbols? Do the symbols express a definite or an indefinite quantity of the element?

What is a formula? What is a chemical equation?

What is the atomic weight of an element? What is a molecular weight? Study the law of equivalent proportions.

What is the symbol of oxygen? How is it prepared? Notice the more prominent physical properties of oxygen. Does oxygen unite readily with other elements? What is the compound of oxygen with another element called? What is meant by oxidation and combustion? What are meant by combustibles and supporters of combustion? When we burn a candle what takes place, and how does the weight of the products compare with that of the candle? Of what importance is oxygen in respiration?

What is ozone? Under what conditions is ozone found, and to what extent? What are properties of ozonized oxygen? In what proportion does ozone exist in air, and how may it be detected?

What are the symbol, valence, and atomic weight of hydrogen? How does hydrogen exist in nature? How is it prepared? Notice some of the prominent physical properties of hydrogen. Is hydrogen combustible? Is it a supporter of combustion or respiration? What is the result of the burning of hydrogen in air? Notice what takes place when certain oxides, as those of iron or copper, are heated in hydrogen.

What is meant by cynthesis and analysis? How can we prove by analysis that water has the composition $H^2 O$? What influence has temperature upon a mixture of oxygen and hydrogen?

Where does water exist in the animal economy? What functions does water perform in the economy? By what channels is water eliminated from the system, and how does the amount discharged compare with that ingested? What substances render water unfit for drinking?

What is meant by organic impurity? Study a rough method of detecting organic impurity? What waters are most liable to organic contamination? What poisonous metal occurs most frequently, and how may it be detected? What influence has the purity of water upon its power of dissolving lead? What practical indications may be drawn from the last question? How may water be purified?

What is a hydrate? What is water of crystalization? Explain the terms, anhydrous, deliquescent, and efflorescent.

What are the more prominent properties of nitrogen?

What are distinctious between a mixture and a chemical compound? What are the constituents of atmospheric air? What is the proportion by volume of nitrogen to oxygen in air? Does this proportion vary much in pure air? What is the function of the nitrogen in air? What is observed with regard to the solubility of air in water? Are gases more soluble in hot or in cold water?

How do the specific gravity and volume of solutions of ammonia vary with the amount of gas dissolved? What are the strengths and specific gravities of the aquæ ammoniæ of the U. S. Pharmacopœia?

Under what popular names is aqua ammonia known? What is the spiritus ammoniæ, U. S. Pharmacopœia? What effect has great cold and pressure upon ammonia?

By what other names is nitrogen monoxide known? By what method is it prepared? Notice some of the physical properties of nitrous oxide. How does N_2O rank as a supporter of combustion and respiration? What effect has N O upon the system when inhaled? What precautions are to be observed in the preparation and use of N^2O as an anæsthetic? How many nitrogen acids are there, and what are they?

What is meant by an acid? What is meant by a metalic hydrate? What is a salt? What is understood by the reaction of a substance?

What is a nitric? What is a salt of nitric acid called? What is the difference between two acids composed of the same elements, the name of one ending in *ous*, that of the other in *ic?* By what names are the salts of these acids distinguished from each other?

What is the formula of nitric acid? How does it exist in nature? What is the principle of the manufacture of HNO_3? What are the physical properties of pure nitric acid? State some of the chemical properties of HNO^3. Name and describe the varieties of HNO^3 met with in commerce and pharmacy. How may nitric acid be detected?

On the plan thus set forth, inform yourself on the more important elements, as Chlorine, Iodine, Bromine, Fluorine, Sulphur, Phosphorus. In the combination of these elements, what does the termination *ide* indicate?

What is aqua regia? Study the properties of hydrochloric, sulphuric, sulphurous, and phosphoric acids. Pass to the study of the metallic elements and their combinations.

What are the physical properties of the metals potassium and sodium? Under what other names is potassium hydrate known? What are the chemical properties of potassium hydrate? What is the action of a solution of KHO on solutions of most metallic salts? What is the strength of liquor potassæ, U. S. Pharmacopœia? What is the action of KHO when taken internally? What antidotes should be used?

What is the compostion of potassium chloride, and where does it exist in nature? What is the composition and what are the physical properties of potassium bromide? What is the formula and what are the common names of potassium nitrate? What are its chief uses?

Study the properties of potassium iodide and potassium bromide. Of the salts of sodium, notice the carbonate, the sulphite.

Follow with the salts of ammonium, the carbonate, the nitrate, the chloride, the gas ammonia (NH_3), aqua ammonia, $H(NH^4)O$. Of all the metals of the alkaline earths, notice the salts of calcium; the sulphate (gypsum); the carbonate; the chloride. Calcium monoxide (lime, quick lime).

Of all the metals of the earths, study aluminum; its most important salts are the alums.

Passing to the metals proper, notice— Iron.— Important salts; ferrous sulphate, ferric sulphate, ferric chloride; tests. Lead.—Acetate (sugar of lead); toxicology; tests. Zinc.—Chloride, Sulphate; test.

Notice nickel as a metal. Tin as a metal.

Chromic acid. Study arsenic; its properties, poisonous effects, antidotes; test. Arsenious oxide and its uses.

Of the compounds of antimony; tartar emetic (tartrate of antimony and potassa). Study the properties of the metal mercury and its two chlorides. The properties of gold, silver and its most important salt, the nitrate. The metal platinum.

From Inorganic Chemistry pass to Organic. Study starch and its derivatries, gum, sugar, dextrin, cellulose, etc. Notice fermentation and its conditions. Inform yourself about alcohol and ether. Of the organic or vegetable acids, notice acetic, oxalic acid and its antidote, tartaric acid, tannie and gallic acids.

Pass now to what are called Organic or Vegetable Alkalies or Alkaloids. Morphia, quinia, cinchona, strychnia, atropia; their uses and properties; where found?

Notice the two classes of oils and fats, the fixed and volatile. What is glycerin? What is wax? What are camphors and resins?

What is caoutchouc, or india-rubber?

Of animal compounds notice albumen, fibrin, gelatin.

AMATEUR INVESTIGATION.

Presidents' Address before the Rochester Academy of Science.

BY REV. MYRON ADAMS.

It has occured to me that a few words respecting the amateur investigators would not he out of place in a society whose membership is perhaps made up of amateurs, and I shall speak the more cheerfully upon that subject because the amateur has sometimes been frowned upon and looked out of countenance and made ashamed of himself by professional persons. He has occasionally been regarded as a mere meddler in high matters which he cannot understand—the very nomenclature of which is strange to him—an intruder into the sacred mysteries, and is not very heartily welcomed by many of the professional brethren into the realm of science.

PRETENDERS EVERYWHERE.

No doubt many who call themselves amateurs deserve such cold or contemptuous regard on the part of wiser men, being in fact no amateurs at all. There are pretenders everwhere. And in science as well, loving high seats in the scientific synagogues, and greetings in the market places, as persons of consideration in a scientific way; but the trouble does not lie in the amateur part of the business, it lies in human depravity, more or less total. The professional scientific world has much of the same blemish.

A LA PANGLOSS.

Professional persons who enjoy sonorous titles, and love to have the sixth part of an alphabet of capitals pointed after their names, are sometimes very absurd persons; but it is not because they are professional; it is because they are depraved (not to put too fine a point on it). They bray forth polysyllable and long-eared erudition, as the sage of Chelsea calls it, to the great detriment of everybody, and ought in fact to have those two or three capital letters, which readily suggest themselves, after their names.

EVERYTHING DISCOVERED.

Now an amateur can make himself ridiculous with a better grace than a professional person could under the same circumstances, upon the same principle by which a cat may look at a king. Poor puss may calmly look, while dukes and dignitaries tremble, and cast down their eyes. An amateur has that and other advantages. Then the professional scientist sometimes goes upon the assumption that nearly everything has been discovered, which can be practically available, or perhaps stands stock-still upon that assumption.

GUNDLING AND COMPANY.

About 150 years ago an academy of sciences, of a purely professional sort (as nearly as I can ascertain), existed without flourishing in the city of Berlin. It was under the presidency of Dr. Gundling, a foolish erudite creature of that day. The chief and probably the only work performed by that academy was the annual production of an almanac. There is no authentic record of anything else. But a king reigned in Berlin, who was of thrifty disposition, hated uselessness, and especially uselessness guarded and sanctified by a title. He was capable, too, this king, of employing measures for the promotion of industry. Could wield a rattan ; did in fact crack the skull of a judge or two, in some incompetent court of alleged justice ; and he might sometime pounce in upon the academy of sciences, rattan in hand, and set upon Gundling and company unless they should make honest effort in some direction. The king proposed to the academy that it should do something, or try to do something in the line of investigation. "Yes, but your majesty, there is nothing to be done ; everything is discovered which can be discovered. There is the weather, we will prognosticate that. Can more be expected of us than that ?" Perhaps not, but the king was not satisfied. He would like to know the *why* of some things ; and what is an academy of sciences good for, if it cannot explain things to kings and others ? Prussian majesty had observed that champagne foams ; now why should champagne presume to foam ? Being occupied in drilling and stealing recruits for his Potsdam regiment of giants, he could not give his time to the matter ; the academy must settle it. Accordingly they get their heads together seriously enough, and after deliberation conclude that champagne does probably foam, and they must have the material to experiment upon; they get the material, and experiment and get no solution ; but do undoubtedly get drunk—professional society too, standing much upon its dignity, when not drunk.

THE PROFESSIONAL RUT.

It is one of the dangers of a purely professional career that it shall cut for itself a deep narrow track of routine, such that nothing is visible or next to nothing from it ; and tramping back and forth in that routine, we have the whole or major part of science. Nothing to be discovered your majesty. Probably not under such conditions.

REGARDLESS OF CONSIDERATIONS.

The amateur, if you glance into the French of it, is simply a lover, assumes to be nothing more than that, is looking into things as occasion offers, trying experiments, examining flowers and water filterings and skeletons, prods about among leaves of trees for cocoons of future bugs, or among the stars above for 70 Opiuchi, reading what books or scraps of books he can get time for, and all simply for the love of it. His professional brother may possibly be over cautious in his searchings, indisposed to entertain new and strange ideas, although some have entertained, in that manner, angels, unawares. Prefers to walk beaten tracks and call everything by name, although in this big world of ours we require engineers to lay out new roads in new regions. But the amateur or lover of nature and her truths is rather regardless of prudential considerations ; perhaps does not even know the beaten tracks, and is ready to go anywhither and make a general promiscuous scramble for information, will not be very scientifically decorous about it ; but just as likely as not, and even a little more likely than not, he will find something.

MUST STRIKE OUT FOR HIMSELF.

In fact I will make the bold statement (and an amateur is nothing if not bold and blundering) that the amateur rather than the professional is the real discoverer ! Or I will put it in another way, to save the feelings of my professional friends : the strictly professional investigator must cease from his strictly professional character, and become an amateur, in order to find any new thing or principle. He must be enamoured with the pursuit of truth that he shall jump out of his professional rut and strike out for himself.

NOTED AMATEURS.

Galileo was an amateur, and turned the world upside down, and got the sun out of its disgrace, as being a mere satelite of the earth. The professional people at Rome tried to make him observe professional etiquette, and almost succeeded ; but he was enough of an amateur at heart to pluck up a little boldness at last. The amateur Ben Franklin, went flying his kite like a school boy,—and with results That person who by profession was an artist in oil painting, was in effective world-changing work, an amateur electrician, Morse the name of him, now known everywhere. And that newsboy, printer, telegraph operator at Menlo park, is mostly an amateur.

THE THEOLOGICAL ASPECTS OF THE MATTER.

And I wish there were time to discuss the theological aspects of this matter a little, because it is in that particular department of science that amateur investigation is most strenuously objected to. Gundling and company, who seemed to have had that science in charge, respond to the demand to the *why*, that all is discovered which can be, all settled sometime before the dark ages. Of all things in this distracted world, amateur theology is incomparably the worst. say Gundling and company. The official professional must do all that is done in that line, and let him be extremely careful, above all things, to discover nothing new ! Deplorably poor weicome the amateur gets in that quarter, which leads many honest and intelligent people to say; "Such being the case, we will have nothing to do with theology." And all of this strenuous, forbidding conduct on the part of the professional Gundling and company is liable to issue in unpleasant consequences wherever the amateur theologians, or lovers of truth for its own sake, get fairly at work.

NO PATENT ON KNOWLEDGE.

Some persons seem to suppose they have patented certain departments of science, but it is a mistake.

THE PRODUCT OF AMATEUR INVESTIGATION.

The amateur has an open field, and if he is true to his name, assumes no authority, does not look wise, he will do very well. The amateur has only to keep his eyes well open (and that is getting to be the common human privilege in these days), to look about him with ardent curiosity, and to try his best to see things as they are, rather than as spiritual or other advisors *say* they are. If he blunders, and the catechism becomes a burden to him, and if he finds he does not know as much as he once supposed, perhaps he will improve, and perhaps really find something worth knowing. I know of nothing more striking to close with, and nothing which is more likely to be regarded as amateur rhetoric, logic and philosophy combined, than to say that the nineteenth century is mostly the product of amateur investigation.

CONDUCTORIAL.

EXPERIMENTS WITH NITROUS OXIDE AND CARBONIC ACID.

At a union meeting of two of the District Societies of Western New York, held at Buffalo the latter part of October last, Dr. W. C. Barrett, assisted by Dr. A. P. Southwick, performed a number of experiments on small animals, using for that purpose nitrous oxide and carbonic acid. The apparatus consisted of a cylinder of nitrous oxide, a larger one of carbonic acid, and a covered glass receiver twelve to fifteen inches in diameter and ten to twelve inches in depth. Near the edge of the cover was a small opening through which, by means of rubber tubing, the gases were conveyed to the confined animals, and through which also their exhalations were permitted to escape into the room. The method followed in each experiment was to place the animal in the receiver, adjust the cover, pass the tubing through the opening above mentioned, and then turn on the gas, the time being taken at the moment of admission of the gas and again when life was pronounced extinct.

The following table gives the kind of animal experimented upon, the gas used, the result of the experiment, and the time consumed:

1. Pigeon (common)	Carbonic acid,	Death,	1 minute, 20 seconds
2. “ “	Nitrous oxide,	“	1 “ 20 “
3. “ (tumbler)	Carbonic acid,	“	1 “ 10 to 25 “ *
4. “ “	Nitrous oxide,	“	1 “ 30 “
5. Rabbit,	Carbonic acid,	†	1 “ 25 “
6. “	Nitrous oxide,	“	1 “ 40 “
7. Mouse,	“ “	“	1 “ 10 “

Artificial respiration was resorted to in all cases except “7,” but without effect except in “5.”

The experiments were followed by a general discussion of nitrous oxide as an anæsthetic, and as an asphyxiating agent, its likeness in some of its effects to carbonic acid, and those characteristic effects which distinguish it from asphyxiating gases in general and carbonic acid in particular.

---

* Disagreement on the part of time keepers.

† Pronounced dead in the time given, but subsequently restored to normal condition by means of artificial respiration

PROF. E. LLOYD HOWARD, M. D.

We take the following from an interesting editorial in the *American Journal of Dental Science*, in regard to the death of Prof. Howard, who died suddenly September 5th, 1881, of uræmic apoplexy:

"At the time of his death Prof. Howard occupied the chair of Chemistry and Materia Medica in the Baltimore College of Dental Surgery, the duties of which he performed with rare ability and in a satisfactory manner to the many classes which have annually been in attendance during his long connection with the institution, extending over a period of thirteen years. Prof. Howard at the time of his death was also President of the Maryland State Board of Health, and Resident Physician at the Marine Hospital, Port of Baltimore.

He was born in Baltimore city, January 14th, 1837, and was the son of the late Charles Howard, and grandson of Gen. John Eager Howard, of revolutionary fame. Dr. Howard's mother is a daughter of Francis S. Key, the author of the 'Star Spangled Banner.'"

Resolutions of respect, etc., were adopted by the faculty, also by the students of the Baltimore College of Dental Surgery.

SQUIBS.

January 1st, 1882. Now pay that little bill.

The Edison lamp is talked of as a good substitute for the Grohnwald stomatoscope.

The Buffalo Microscopical Club calender has our friend Barrett down for "The Cell Dogma."

Fowler's temporary stopping, samples of which have been so thoroughly distributed hereabouts, is "remarkably plastic."

We would like to thank somebody for a clean copy of White's "Dental Materia Medica."

"Where has my Johnnie gone?" In other words, what has become of the proceedings of our State Dental Society?

The *Ohio State Journal of Dental Science* starts out this year as a monthly. Evidently there is nothing that succeeds like success.

Her teeth had been filled *temperately* with gutta percha, but she thought they would now bear something more *pertinent*.

The *Missouri Dental Journal* offers its subscribers a big premium. Friend Spalding must have the inside track of somebody, otherwise he couldn't do it.

Dr. J. Requa, of this city, has taken hold of the "Chemical preparation of cavities of decay." Our local club was favored a short time ago with a preliminary paper.

This month or next Dr. W. C. Barrett, of Buffalo, will deliver before the students of dental department of the University of Pennsylvania, a short course of lectures on "Anæsthesia and Anæsthetics."

At the December meeting of the Rochester Academy of Science, Mr. L. R. Sexton of this city, sole agent for Gundlach's work, exhibited two new microscope stands that for beauty, efficiency and inexpensiveness give color to the belief that the limit in such things has been nearly reached.

At the last union meeting of the 7th and 8th District Dental Societies, the following were made chairmen of sections I to V respectively: Drs. J. Requa, J. Edw. Line, Rochester; A. P. Burkhart, Dansville; G. C. Daholl and Geo. B. Snow, Buffalo.

Dr. R. Shelton McKenzie, the well-known author and journalist, died November 21st, after a three days illness. He was well known to graduates of the Philadelphia Dental College as one of the most active members of its board of trustees.

The "*Medical Brief*" would read better if its contents were classified. As it is one must read all the journal contains to get at what he *may* want to know. The editor forgets that life is short, and that for some of us the kingdom of heaven is not far off.

"Vitalized air" is said to be composed of nitrous oxide, chloroform and deception, the quantity of the last named ingredient being determined by the nature and number of questions put by the too inquisitive patient.

Don't grumble if items of interest to you and your society are not found in the journals. Make your officers supply the facts or, what is better do it yourself. This is a free country and everybody is privileged to attend to every otherbody's business.

We are indebted to our friend Dr. John P. Codman, of Boston, for an invitation to the 14th Annual Meeting and Dinner of the American Academy of Dental Science. We couldn't go, hence the ceaseless cravings of our "inners," which will not comforted because that dinner was not—for us.

The next annual meeting of the Seventh District Dental Society will be held at Auburn. Dr. Geo. W. Tripp, president of the society, has let it out in some way that he will "throw" himself, even if it puts every member in the neighboring prison, where they may find opportunity to fill teeth for the State.

Prof. James Truman, formerly one of the faculty of the Pennsylvania College of Dental Surgery, has just finished a short course of lectures before the students of that institution, also a similar course before the students of the Dental Department of the University of Pennsylvania. Both institutions are to be congratulated.

Johnston's Dental Miscellany is a thing of the past. In his notice of its discontinuance the editor says: "We trust that all of our old friends will become subscribers for the *Cosmos*, if they are not such already." Now why didn't he substitute "*Odontographic*" for the journal named. It would have been generous, though not necessarily just.

The authorities of the University of Pennsylvania have decided as follows in regard to the term of study in the medical department: "That for and after the session of 1883–84, the winter term of instruction upon which attendance is required, will be extended to *six and a half months*—from the first Monday in October to the middle of April." The present winter term is about five months.

Dr. W. E. Royce, of Brockport, has just gone to London, Eng., for the purpose of "prosecuting" (as a complimentary notice in a Brockport paper has it), his profession. Why he should go abroad for the purpose of treating the profession in that manner is more than "some fellers can find out." But fun aside, the doctor is a great loss to the Seventh District Dental Society, and a substantial addition to the American colony abroad.

We want it understood that a Review of "Unfortunate Interference" on page 103 of this issue, was sent to us as an original communication, and put in type as such. We make this statement because of the appearaace of the same article *as an original communication*, in the December number of the *Dental Jairus*—a month sooner than was possible for *the* "original" to reach the profession through this journal. Friend Thrailkill was a little "too previous." As to "One of the Few," we will attend to him by letter.

BOOKS, PAMPHLETS, PERIODICALS.

A Manual of Practical Normal Histology. By T. Mitchell Prudden, M. D., Director of the Physiological and Pathological Laboratory of the Alumni Association of the College of Physicians and Surgeons, N. Y., etc. etc. New York: G. P. Putnam's Sons. Rochester: Steele & Avery. Pp. 249.

The following from the preface gives a fair notion of the design and method of the book: "It is especially designed for those who study the science in classes, with an instructor in a laboratory; but the technical proceedures are described with sufficient fullness for the needs of those who are obliged to pursue the study by themselves. The method adopted is to give a brief description of the tissues and organs in appropriate sequence, following each description with an account of the way in which the structures described may be demonstrated."

The student is told that "the descriptions were written for the most part at the microscope table, with the preparations made by the methods recommended, under the eye of the writer," from which he may infer their accuracy. Much stress is placed upon "the necessity of each student making outline sketches of all but the more complicated structures examined," and for this exercise limited means are afforded in the form of blank pages at the end of the book.

In the introduction the student is instructed in a general way in the preparation and use of hardening, preservative and staining agents; in injecting, embedding and mounting. Chapter 1st treats of the cell in general, after which follow numerous chapters on connective, muscular, nerve and other tissues. Each chapter closes with a "practical study." An excellent feature of the book is the prominence given in each chapter to the names of parts to be looked for and studied, which is done by means of italics and in such a way as to index the whole chapter at a glance. It is a good working-book in every respect, and as it contains no illustrations the student is not likely to experience the disappointment that comes of the study of drawings that are too often diagrams—or something worse.

We acknowledge the receipt of the following since our last issue:

The *Missouri Dental Journal* for October, November and December; the *Dental Cosmos, Medical Record* (weekly), *Stoddart's Review* and *Medical Brief* for the same months: the *American Journal of Microscopy* for August and September; the *Dental Headlight* and *Dental Office and Laboratory* for October; the *College and Clinical Record, Dental Luminary* and *Dental News* for November; the *Dental Miscellany* for December.

FILINGS.

A dentist's sign: Drawing, Music and Dancing.

The villain now on trial at Washington will soon Guiteau; in other words "take a drop"—of twenty feet.

A Michigan "medical practitioner" prescribes the following: A powder of egg shells, twenty grains, annually every hour, till her bowels are removed.

Lesson for young housekeepers.—"How can you tell a young fowl from an old one?" "By the teeth." "By the teeth? but fowls have no teeth!" "I know they havn't, but I have."

"Fat's this celluloid they're talkin' about so much?" said Pat to Mike. "I don't know," replied Mike, "unless its the cell-u-loid in at the station-house last night."

An exchange says: Richenbach, in noticing the statement that Dr. E. C. Spitzka found in the egg of a turtle a live maggot, says that he once found in a hen's egg a small piece of printed paper.

Two gentlemen of this city relate a similar experience. Each within a week removed from a hen's egg a worm-like "critter" an inch or more in length. The hens have been arrested for adulterating food.

Some years ago Miss Libbie Minkler, of Rochelle, Ill., lost both arms by falling in front of a reaper. To-day she is earning a good living by oil painting, holding the brush in her teeth.

"An æsthetic discourse," said Lady Althea to her husband, as they rode home from church. "Right you are," said Lord Algernon who had found a soft place on the pew rail for the repose of his lordly head. "It was anæsthetic."

Next time you shiver at having a tooth pulled think of Joseph Brooks, of Colorado. He lay still and let a bear chaw his arm off, and thereby saved the rest of his body. Come to read the item over again, it was a wooden arm, but Joseph wasn't to blame for that.

Casper: "I see by this report that our teacher's old friend, Dr. Blank, fills teeth 'by reflection.' What does he mean by that?"

Frank: "Don't know; ask the boss."

Teacher: "He means that he fills them 'in his mind.' He's well off, you know."

THE

ODONTOGRAPHIC JOURNAL.

VOLUME III.—*April*, 1882.—1.

THE STRUCTURE OF SO-CALLED "PROTOPLASM."

BY C. HEITZMAN, M. D., NEW YORK.

"Protoplasm" is the name given to living matter, by Max Schultze, in 1861. Max Schultze, himself, thought a nucleus and granules to be material properties of a "cell," composed of "protoplasm;" while later observers, such as E. Brücke and S. Stricker, removed the nucleus and the granules from the schema of the "cell," and "protoplasm," at the beginning of the 8th decade, was considered to be structureless by the best German biologists, and also by Lionel S. Beale, of England. In 1873* I announced the so-called "protoplasm" to be reticular in structure.

The reticulum in the "protoplasm" was seen and depicted by Nasmyth (1839) in corpuscles, which to-day are known to be the covering epithelia of the tooth; by C. Fromman (1867) in "ganglion cells," and by others in the same and other corpuscles. What I have described is a reticular structure of the "protoplasm" as a universal occurrence, and my statements have since been corroborated by all good observers.

NOTE.—The author is about to publish the results of his researches, made within the last ten years, in the form of a book, entitled "Microscopic Morphology." He communicates herewith a portion of the work as a specimen of the whole.

* Transactions of the Imperial Academy of Sciences, Vienna.

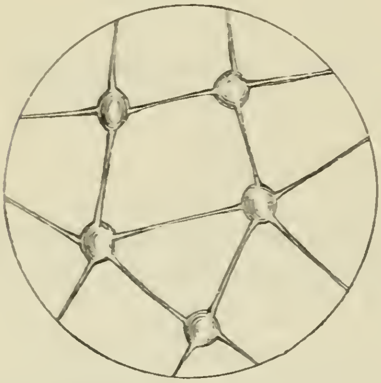
In 1877 I added the following:[*]

“The fully-developed protoplasmic body is constructed like a sponge, but, at the same time, inclosed on all sides by the same substance which forms the trabeculæ of the sponge—the trabeculæ and the shell being the living matter.

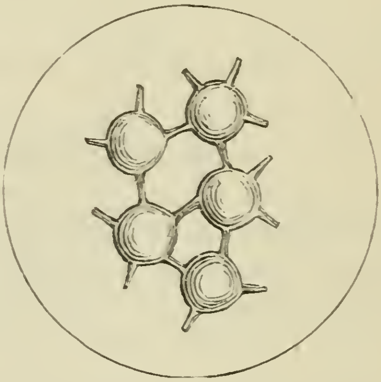
“An analysis of the observations of the living protoplasmic body teaches us that there can be distinguished mainly three different appearances of the net-like living matter, namely, that of rest, that of active contraction, and that of passive extension.

“In the state of rest, as seen in a motionless amœba, or immediately after death, the granules are almost uniformly distributed throughout the protoplasm, united with each other by slender threads, the bridges of living matter. (See Fig. A).

A



B



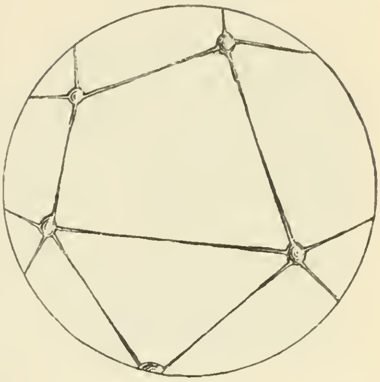
“In contraction we observe an enlargement of the granules by shortening of their uniting threads and approximation to each other. (See Fig. B). Nothing has been added to the living matter and nothing lost from it; only the distribution of the plastidules has changed, leading to the narrowing of the network and a partial expulsion of the fluid formerly contained in its meshes. Contraction is the active property of living matter, and on it are based the simple change of shape and the locomotion of the whole organism.

“Extension depends upon a decrease of size of the granules, with a removal from each other and an elongation of the uniting threads at the expense of the bulk of the granules, even to the disappearance of all structure. (See Fig. D). The extension takes place in a passive manner; the fluid contained in the meshes of the living matter is pushed out toward the periphery, and there leads to the formation of a protruding offshoot—the hyaline flap. At the beginning of the protrusion we still observe in the flap the presence of structure, while at the highest point of extension the structure can no longer be seen, because granules and threads have been elongated to their utmost capability. We may compare this phenomenon to the extension of glass rods melted in a flame until the threads become so thin as to disappear to the naked eye.

---

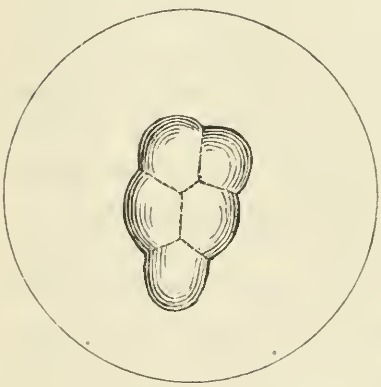
[*] The Cell Doctrine in the Light of Recent Investigations.—*New York Medical Journal*, 1877.

D



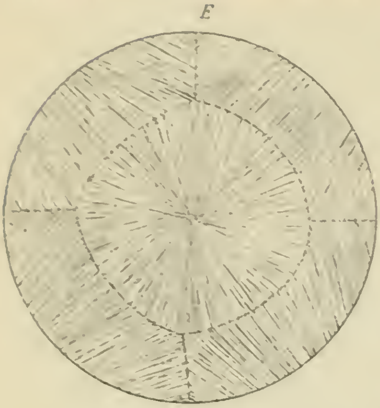
"These three states of living matter explain to us not only the movement of a simple protoplasmic lump, but also the action of the most highly-developed muscles, which, as I have demonstrated, are entirely identical in their structure with the simple amœba. Were the amœba a sponge without an enclosing layer of living matter on its surface, every contraction would lead to an escape of the fluid, and no locomotion would be possible; the presence of an outer, although very thin, layer of living matter is necessary to the various movements of living protoplasmic bodies.

C



"By adding a drop of glycerine to the creeping amœba, or to any protoplasmic body, we can bring about a fourth state of living matter, viz., the highest degree of contraction, for which S. Stricker and I have proposed the term "tetanus." The fluid of the protoplasm being suddenly extracted by the glycerine, all granules flow together, forming a structureless lump of much smaller size than that of the original corpuscle, without visible limits of the single granules. (See Fig. C). Rehabilitation of the former net-like structure is produced by taking away the glycerine and adding water, without reëstablishment of motion.

"All these changes of living matter can be directly seen under the microscope. But we cannot observe the formation of a flat, extended layer at the boundaries of the whole body, at those of a hollow nucleus and of every vacuole. I therefore had to have recourse to the hypothesis that a granule may send out offshoots in great number, leading to the disappearance of the central mass, and that these offshoots, melted together, may produce a continuous layer. By the union of many such areas an extensive layer could be produced, large enough to cover in the whole protoplasmic body. (See Fig. E).



"The presence of a layer of living substance on the outer surface of the body explains to us why every protoplasmic lump can so easily take up foreign bodies, and why vacuoles can form and disappear almost suddenly. We must imagine that the living matter is capable of entering any of the described states at any time, so that a flat layer, for instance, may immediately change into a network, and *vice versa*. When the lump swells up through the addition of water, the granules are torn apart and float freely in the fluid, as occurs in swelled amœbæ and saliva-corpuscles. The breaking of the outer shell, with escape of minute particles of the amœba, still endowed with life, and the process of the division, can also easily be understood. * * * *

"In conclusion, I may draw attention to the fact that the amount of living matter varies greatly within a limited bulk of protoplasm, both in normal and morbid conditions. The colorless blood-corpuscles of persons exhibiting signs of lymphatic, strumous, scrofulous constitution contain much less living matter than those of strong, vigorous persons. Further examinations will, in all probability, teach us to make use of these differences for practical purposes. I announced three years ago that the protoplasmic lumps forming tubercle are characterized by a relatively small amount of living matter. Last year I published my observations on pus-corpuscles, which enable me, from the relative amount of living matter contained in an individual corpuscle, to say from what kind of organism such a pus-corpuscle is formed; whether the person from whom the pus comes is healthy and strong, or weakened by chronic disease, as tuberculosis."

The idea of a structureless protoplasm was not satisfactory. Since 1873 this structure has been known to be reticular, though the reticulum itself, with all its nodulations, allows of no further discrimination of structure. How complicated the reticular or filamentous structure of the nucleus may be, is brought to evidence by the researches of Auerbach, Flemming, Beneden, O. Hertwig and others. The radiation of "suns," as they appear in the process of divison of the nucleus, the "Karyokinesis" of Flemming become explicable by the presence of a substance able to grow, to move, and to assume different shapes.

ONLY A PART OF PROTOPLASM IS LIVING MATTER.

The main stress is to be laid on my assertion that not the whole mass, hitherto termed protoplasm, is endowed with the properties of life, but only a part of it,—the living matter proper. As I shall later on demonstrate, the living matter appears first in the shape of a solid, homogeneous, apparently structureless, granule, which by growing, by taking in liquid, and by splitting into a reticulum, becomes what has been termed protoplasm. *Protoplasm*, therefore, *is only one stage in the development of living matter*, and by no means its exclusive appearance under the microscope.

The two main properties of living matter, motion and growth, are possessed by even the smallest lump of living matter. The motion is relatively little marked in a solid lump, and becomes more evident the more the living lump is split up into a reticulum,—the more it assumes the appearance of "protoplasm." Growth, on the contrary, is a marked property of every granule of living matter; on the increase of its size depends generation, formation of complicated organs and organisms, and new formation so striking in inflammation and in tumors. All varieties of generation are due to motion and growth of the living matter; the protoplasmic liquid, probably nitrogenous, and of secondary formation, being a carrier of nutritive and used-up material of the living matter. The formation of the basis and cement substance and the process of secretion, furnish direct proofs of the significance of the protoplasmic liquid.

CHEMICAL RE-AGENTS.

Very little is known as to chemical tests of living matter. Carmine solutions as a rule stain it, and this explains why the nucleus, which holds a great deal more living matter than the rest of protoplasm, is more deeply stained; the action of hæmatoxylon (in alcohol specimens), is similar; chloride of gold renders living matter dark violet; but neither is absolutely reliable. Acids destroy living matter, consequently also acetic acid. The former method of bringing into view the nucleus by treatment with acetic acid, simply destroyed the rest, due to the fact that the bulky formations of the nucleus resist the action of acetic acid more than the scattered formations in the protoplasm. This re-agent has scarcely any value. The different stainings of tissues by different re-agents, especially combinations of indigo, picric acid and aniline colors, are caused by a difference of chemical products of living matter, rather than a difference of the living matter itself.

ANALYSIS OF REST.

Protoplasm, as long as it is alive, can never be at absolute rest, and in the protoplasm a uniform distribution of reticulum is not observable as long as motion is present. The condition of comparative rest may be exhibited by a portion of the protoplasm, while another portion is in the condition of contraction, another again in that of extension. Rest is death, and seen in motionless blood- or pus-corpuscles, which on dying, often assume the globular shape, an accomplished equilibrium of the reticulum. By evaporation of the liquid, even such globular bodies may present a jagged, irregular shape, which is not amœboid, as has been erroneously supposed, but the result of shrinkage. Death, however, may ensue at any moment of contraction and extension. If the living matter be killed instantaneously by a re-agent, motionless pus-corpuscles, as in urine, may be found in greatly varying amœboid shapes, and the peculiarities of the reticulum in the contracted and extended condition, remain fixed in such corpuscles, if kept in such preserving fluids as solution of chromic acid.

ANALYSIS OF CONTRACTION AND EXTENSION.

Contraction of the reticulum causes the amœboid motion and the locomotion of the protoplasmic mass. The liquid held in the meshes, being driven out of the contracted portion, will rush into a portion at the time at rest, and will extend this portion in the shape of what has been termed *pseudopodia*. If contraction takes place in one half of the protoplasmic mass, the other half will be in extension; if two peripheral segments be contracted, the intermediate portion will be extended. The latter was suggested by Herman long before the structure of protoplasm was known. In the former instance a flap will protrude of nearly the diameter of the body itself; in the latter a narrow offshoot, a *pseudopodium*, will make its appearance, varying in length, and exhibiting an indistinct structure, or being apparently devoid of structure on account of the great stretching of the reticulum. To allow locomotion to be accomplished, the protruded flap must adhere to a solid base, so as to have a point of fixation, toward which the balance of the body is dragged. An amœbia, a colorless blood corpuscle, can commence creeping only after one of the protruded flaps has reached the upper surface of the slide, or the lower surface of the covering glass, for the same reason that a man can make a step only on a solid ground, and climb only by attaching himself with arms or legs to a support. The motion of protoplasmic lumps is liveliest if the slide and cover be close together and the intervening layer of liquid very thin.

ANALYSIS OF TETANUS.

Tetanic contraction was first observed by S. Srricker in colorless blood corpuscles in lively motion (the slide and covering glass being closely attached to each other), at the moment when the cover was lifted a little by the addition of an indifferent liquid close to the edge of the specimen. As soon as the liquid evaporated, motion and locomotion once more set in. I have produced the same condition by the addition of glycerine. Tetanus is also observed in most of the colorless blood corpuscles and amœbiæ, immediately after their transportation to the slide, evidently due to mechanical shock. The electric current yields similar results. To call such a condition "rest," is certainly erroneous.

ANALYSIS OF INVESTING LAYERS.

The production of the layer of living matter around the protoplasmic mass and a hollow nucleus, can be explained hypothetically only. Such a layer is far from being an investing membrane, in the sense of the old cell doctrine; it is identical in every respect with the reticulum within the protoplasm. Its capacity of admitting extension is surprisingly great. The thicker this wall, either around the nucleus or around the protoplasm, the less the capacity of producing amœboid motion or locomotion. Solid nuclei, and nuclei with a broad investing shell, do not themselves move, but are carried along in a mechanical, passive way, by the moving reticulum. Coarsely granular protoplasmic bodies with a very marked investing layer, do not move. The finer the reticulum respecting its points of intersection, and the thinner the covering layer of living matter, the more pronounced is the capacity of amœboid motion and locomotion.

The continuous layer of living matter may at any time and almost instantaneously be transformed into a reticulum. A foreign body may be taken into the interior of a protoplasmic body by offshoots embracing the foreign mass, the distal ends of the offshoots then coalescing, and lastly, at the proximal ends, the inclosing layers being converted into a reticulum. The thinner a flat layer or the more it is stretched, the more prone is it to fuse with neighboring formations of the same kind. Long offshoots of amœbæ, for example, easily coalesce to form a coarse reticulum. Not all foreign bodies that are taken into the interior of the amœbæ can serve as pabulum, as for example, carmine and aniline granules, silicious shells of diatoms, etc. The bursting of the outer investing layer is necessary for the extrusion of foreign bodies, or fat-granules or a liquid. Such a wound at the periphery of the protoplasmic body may heal immediately by coalescence of the flat layer. Obviously the bursting must be due to a sudden and intense contraction of the reticulum close behind, and as the foreign particles are often driven out with a certain force like a shot, we may conclude that together with the foreign body also a certain amount of liquid has escaped from the interior. A momentary re-establishment of comparative rest in the contracted portion does also seem to be required for the coalescence of the separate portions of the outer flat layer. A part of the reticulum itself may penetrate the investing layer, or a single granule with adhering filament. The result will be a small protrusion or a single granule attached to the outer surface by a slender pedicle.

ANALYSIS OF VACUOLES.

A vacuole is a lake in the middle of the protoplasmic body, inclosed by a continuous layer of living matter. Without such an investing wall the lake could not be formed. The vocuole may increase in size either by stretching of the encircling layer, or by confluence with a neighboring vacuole, if the wall between the two should break. The vacuole may appear suddenly and also suddenly disappear. Granules of living matter are sometimes seen floating in the lake; sometimes offshoots of a granule reach the inner surface of the wall of the vacuole, and the reticular structure is immediately re-established. Vacuoles may be formed and may disappear suddenly in ways and for reasons which we do not as yet understand. Formerly the vacuoles were thought to be stomachs of the protoplasm, an assumption for which we have no ground whatsoever; while embryological research, on the contrary, proves that vacuoles are elementary vascular organs containing plasma; and as E. Klein first demonstrated, the heart and the blood-vessels are originally nothing else than vacuoles.

COMPARISON OF AMŒBA AND MAN.

The analysis of a single protoplasmic lump is of the greatest importance, inasmuch as such a lump is the simplest animal organism on the plan of which are built all, even the most complicated, organisms. It will be demonstrated elsewhere that the human body is constructed on the plan of the amœba, and the comparison will be carried out in all details. Man is a complex amœba with permanent protrusions—the extremities,—with a wonderfully complicated division of labor of the groups of the living matter. Man in toto is an individual, as is the amœba, and in both isolated lumps of living matter float about, in the one case in vacuoles, in the other in the blood- and lymph-vessels.

TREATMENT OF THE MOUTH DURING THE ERUPTION OF THE PERMANENT TEETH.

It is generally held to be good doctrine that the deciduous teeth should be retained in the mouth till their successors, the permanent ones, appear; and as thus abstractly recited, the doctrine is undoubtedly sound. The process of nature, when unhindered, needs only to be watched to learn so much. The deciduous teeth erupt, attain their size, do their work, become loose, and fall out to give place to the firmer, stronger ones that are to attend man through his chewing days. When these milk-teeth fall, instead of long roots which it was supposed they had, lo! there is seen only a ragged-edged base, and no root at all. Now, it is a fact that the deciduous teeth, in their fullest development, have proportionally longer roots than the permanent ones. Where are they? Absorbed. The pressure upon them of the growing permanent germs, causes absorption. Two results are thus attained. The obstacle, which is the deciduous root, is removed out of the way of its ambitious successor; and an irritation is kept up by means of this pressure, which facilitates the process of development.

Remove the milk tooth while yet its root is of full length, unpushed by its supplanter, and the eruption of the latter is checked, and often delayed for months. Why? The healthful excitement so greatly conducive to its growth is wanting. It is by antagonism we advance. In indolence we stagnate, if not retrograde. The principle runs through nature.

But this normal process may by some means be interrupted or prevented, and a corresponding departure from standard treatment be necessary to counteract the evils which such interruption or prevention would cause. In such a case our so-called "sound doctrine" would be very bad doctrine, and the effect of its application pernicious.

From some cause, to us unknown, the new tooth may be turned from its normal course, and when discovered may point without or within the proper circle. If this state of things is not corrected, a wide departure from propriety will ensue. The erupting crown of any of the twelve front teeth, in shape a wedge with its base downwards (inwards), presents its inclined surface to and impinges upon the inclined surface of the root of the occupying tooth, it also being in shape a wedge with its base upwards (outwards), and the inevitable result is a growing displacement.

Or the permanent six-year molar and permanent first bicuspid on either side of either jaw may develope to a full size while yet the temporary molar remains firm, and be so shaped and inclined as to overhang, before and behind, this shorter temporary molar, thus locking it in its position firmly. The new second bicuspid coming up to succeed it, makes its way in the track of the dissolving roots of the temporary molar till it reaches the gum margin, where it meets the obstructing wedged crown, which will neither dissolve nor dislodge, when it either remains undeveloped or shoots off in a wrong direction, causing deformity and injury. This is a condition often overlooked. To correct it, the wedged crown of the temporary molar must at once be removed. Again, a careful examination of the mouth during the period of eruption of the permanent teeth may lead the wise dentist to the conclusion that the upper and lower dental arches, when sufficiently expanded to bear a symmetrical relation to the frame work of the other features, will not accommodate all the teeth which will naturally erupt therein; in other words, that if all the permanent teeth are allowed to take their places, the jaws will be so expanded as to cause disproportion in the features,—the mouth. He will see also, mentally, a crowded arch, teeth forced out of line, contacting surfaces decayed, and an endless need of the dentist's remedial services. This, it may be objected, is too much for a dentist to foresee. I think not. He is supposed to understand the normal development of the region he is educated to treat. He should know, when looking at the nose, cheek bones and chin, what sort of a mouth properly belongs to them. And having closely observed the processes of nature, he should be able to tell what is likely to be the extent of maxillary and alveolar development; how much space there is likely to be in a normally developed alveolar ridge. How, when the first permanent teeth appear, a fair judgment can be formed as to the size of the entire set, and the conclusion quite safely reached whether they will have sufficient room. If it is concluded that they will not, then the future welfare of that mouth requires that certain teeth be sacrificed. The next question is, which shall they be? While allowing that varying circumstances may vary the decision of this question, I would say, as a rule, the six-year molars. "And why?" queries my sharp reviewer. I will state why. For several reasons:

1st. They are usually the least durable teeth in the mouth.

2d. If extracted before the second molars erupt, the teeth forward of them will naturally fall back slightly, thus gaining relief from lateral pressure, and the second molars, as they develop, will come gradually forward into the places made vacant, closing up all spaces and making an unbroken masticating surface.

3d. Room being thus provided at the ends of the alveolar ridge, the *dentes sapientiæ* can erupt more easily, more regularly, less painfully, and in positions where their usefulness will be greatly increased.—MARVIN, *Missouri Dental Journal.*

◆

THE AMERICAN MEDICAL STUDENT.

There are at present in the United States about twelve thousand medical students. The number has more than doubled in the past ten years. The universality of this class of students has also become more pronounced. There is now a "centre of learning" for them in almost every State. In Maine, in Oregon, on the high plateaus of Colorado, on the prairies nearer east, and along the Gulf, there are institutions which all furnish exceptional advantages for the prosecution of his work. It is evident that the medical student has become no small factor in society.

We have 1,800 in this city, and there are not far from 2,200 in the State. Ohio stands next in number, having 1,400, thanks to a large attendance upon irregular schools. Pennsylvania follows with 1,200 students, and Illinois with 1,000, nearly one-third of the last number being homœopaths. Missouri and Kentucky have about 700; Maryland, Michigan and Tennessee, each 500. Massachusetts has only about 400.*

It would not be easy to portray the type of a class so widely distributed and subject to so many different conditions. The Harvard medical student, if we may credit the statement of his instructors, must be quite a different creature from some of his prairie or even of his New York *confreres.* The per cent. of college bred men in the Harvard Medical School is nearly fifty. That in the Kentucky schools is zero. Among Missouri's seven hundred students two had received a classical education. New York's per cent. is about 17; that of Illinois, 16; that of Pennsylvania, 8; and that of Ohio, 6,†—these being only approximate figures. While the possession of a careful preliminary training does not always insure superiority as student or physician, it undoubtedly has much influence upon his character and manners.

New York city gathers in medical students from every quarter of the western hemisphere, and here is the best place, perhaps, to study the average specimen and place a due value upon him.

He comes in from the country or some small town, where he has been spending the summer with his preceptor. He has picked up quite a number of ideas in his recent work, and has some very positive views upon a few pathological or therapeutical points. Having consulted a boarding house directory, he takes a room with board in an establishment which can hardly be supremely genteel and charge only six dollars a week. The question of locality was settled with our student, however, by his seeing a nice-looking girl practising on the piano in the front parlor, while he was discussing terms with the landlady. He matriculates, joins a quiz, and settles down to work; for our American medical student is essentially an industrious fellow. He must graduate after two courses, and his hard studying is done for the most part during his two winters at the college. But he is not entirely unsocial or non-convivial. He picks up some acquaintances, and takes a chum. There is a gradual accumulation of beer-bottles under the bed. A few bones, and rather more pipes adorn his tables and walls. Although the chemical professor has discoursed upon nicotine, and shown that

---

* Report of the Commissioner of Education for 1879. Washington, 1881.

† Vide op. cit.

> "One (or two at most)
> Drops make a cat
> A ghost,"

a permanent odor of *Tabaci foliæ* attaches itself to the room.

As our student progresses in acquaintances, he finds that the mind really needs intervals of rest and relaxation—a point in mental hygiene which takes an especially strong hold upon him. By this time he knows the young lady of the house very well. She has taken him to church, and he has escorted her to the theatre. He horrifies her with tales of the dissecting-room, and with the most harrowing and hemorrhagic descriptions. She thinks the doctor's life very hard, but sympathetically asserts that it is a very noble one; and it is not impossible that he squeezed her hand one evening in the back parlor.

Our friend awakes on a certain morning, and has an indistinct impression that he visited from ten to twenty beer-saloons the previous evening, with a party of friends. How it ended, or how he got home it is not easy to recall. This experience, though subsequently repeated, is not a frequent one.

Our student's conduct in the lecture room is, on the whole, a dignified one. There is occasionally an interchange of missiles between hours, some loud talking, or even a scrimmage. But he finds that to be boisterous is a habit that is wearing away, and now has a hold only in the inferior schools.

The individual who is kindly sitting for us does not wear fashionable clothes. He shows a slight aspiration for gentility in the matter of sleeve-buttons, which are in the skull and cross-bones style, with green glass eyes; also in his cane, of which the head is grotesquely carved. With this he walks up Fifth avenue on Sundays. He has one or two nice acquaintances, but, on the whole, his appearance in society is confined to the unpretentious boarding house hop or more quiet social gatherings, all terminating invariably in ice-cream and cake. He still likes to bring stories from the college into his general conversation, and is rather proud of the sensations which his descriptions or comments call out. When dining with his chum and another medical friend at the general table, the conversation may at times have a somewhat atonic effect upon the lay listeners.

As examinations approach, he works harder, smokes more, and drinks just as much; and when he has passed and received his degree, he is just as likely as not to pack up and go straight home in a perfectly normal and non-alcoholic condition.

Our average student is not a bad fellow nor an extraordinary fellow; he has no great fondness for study, but he works with enthusiasm and graduates creditably. He settles in the country or in some provincial centre, battles with fortune and disease against heavy odds, for several years, finally establishes himself, and becomes a useful and respected member of society, passing from the "average student" to be something more than an average man.

There are some odd types hanging about our colleges, and among them we should not forget the *dilettante* student, who has become something of a feature in late years. He has plenty of money, and spends it freely on cigarettes, beer, the theatre, and the other necessaries of medical student life. Just now he wears very tight pants, very short coats, and very pointed shoes. His parents did not succeed in persuading him to go through college; but they want their boy to study a profession, and medicine seemed to be in least discord with his tastes. The student in question does not study, but has considerable dissecting room enthusiasm, likes clinics, takes a great many sprees, and finally hires a tutor to cram him for examinations. He sometimes turns out well after all.

The rowdy student has not entirely disappeared. He is dirty in person, coarse by nature, and made more so by his studies, for medicine makes its followers either better or worse. He revels in obscene stories and vulgar jokes. During lecture he takes a few notes, and expectorates a great deal of tobacco juice. He never studies, but he crams spasmodically, borrowing his friend's notes for the purpose. As the end of the term approaches he becomes greatly excited, and is very busy getting "points" for the examination, with which he mixes himself up till he is a curious picture of bravado and ignorance. We are sorry to say that he generally passes, after which he proves to his companions that he received the hardest and most unreasonable questions. He then proceeds with all rapidity to get into a state of alcoholic coma, from which he in time emerges, and lays plans for his prospective high and beneficent career.

Among our twelve thousand medical students there is a per cent. which is not large, of earnest, cultivated, and ambitious minds. They may be brilliant, or may show only dogged industry and high purpose. It is from these that American medicine may most expect its progress. They are those who can work patiently in laboratory and library as well as by the bedside, who are not content with routine or a narrow knowledge of their craft. Their number is increasing, perhaps more proportionately than the general increase. Knowing that there are such students as these, it is comforting to reflect that in the fierce contest for a foothold among our seventy thousand medical men, those who are really best will, as a rule, succeed. We have to admit that in a minority of cases audacity and unscrupulousness press hard upon the honest practitioner.—*Medical Record.*

HYGIENIC PRECAUTIONS—THE TEETH.

A hard crust is the best possible dentifrice. I never could get myself to believe in the natural necessity of a tooth brush. The African nations, the Hindoos, the natives of Southern Europe, the South Sea Islanders, the Arabs, the South American vegetarians—in short, three-fourths of our fellow men, besides our next relatives, the frugivorous animals, have splendid teeth without sozodont. I really believe that ours decay from sheer disuse; the boarding house *homo* lives chiefly on pap—wants all his meats soft-boiled, and growls at cold biscuit or an undone potato; in other words, he delegates to the cook the proper functions of his teeth. We hear occasionally of old men getting a second, or rather third, set of teeth. I met one of them in Northern Guatemala, and ascertained that he had become toothless during a twelve years' sojourn in a seaport town, and that he got his new set upon his return to his native village, where circumstances obliged him to resume the hard corncake diet of his boyhood years. His teeth had reappeared, as soon as their services were called for, and would probably never have absented themselves if a pap-diet had not made them superfluous. An artificial dentifrice will certainly keep the teeth white, but that does not prevent their premature decay; disuse gradually softens their substance, till one fine day the hash-eater snaps his best incisor upon an unexpected piece of bone. Every old dentist knows hundreds of city customers whom the daily use of tooth-brush did not save from the necessity of applying, before the end of their fortieth year, for a complete "celluloid set."

I do not say that a soft tooth-brush and such dentifrices as oatmeal or burned arrow-root can do any harm, but, for sanitary purposes, such precautions must be supplemented by *dental exercise.* Let a child invigorate its teeth by chewing a hard crust, or, better yet, a handful of "St. John's bread," or carob-beans, the edible pod of the *Mimosa siliqua.* Children and whole tribes of the Northern races seem to feel an indistinct desire to exercise their teeth upon some solid substance, as pet squirrels will gnaw the furniture if you give them nut-kernels instead of nuts. Thus Kohl tells us that the natives of southern Russia are addicted to the practice of chewing a vegetable product which he at first supposed to be pumpkin or melon seeds, but found to be the much harder seed of the Turkish sunflower, *(Helianthus perennis).* Their natural diet consists of milk, *kukuruz* (hominy, with butter, etc.), and boiled mutton, and they seem to feel that their Turkoman jaws need something more substantial. The schoolboy habit of gnawing penholders, finger-nails, etc., may have a similar significance. The *Mimosa siliqua* would yield abundantly in our Southern States, and its sweet pods would make an excellent substitute for chewing-gum. Our practice of sipping ice-cold and steaming-hot drinks, turn about, has also a very injurious effect upon the brittle substance that forms the enamel of our teeth; no porcelain-glaze would stand such abuse for any length of time, and experience has taught hunters and dog-fanciers that it destroys even the bone crushing fangs of the animal from which our canine teeth derive their name.—OSWALD, *Popular Science Monthly.*

◆

IODIDE OF ZINC.

The above is an almost colorless granular substance, resembling the chloride, and, like it, readily deliquescing on exposure to the air; hence, it must be protected by a glass stopper if it is to be used in full strength. It is superior to the chloride for its stimulant and escharotic effects, and is very valuable as a pain obtunder in many cases. After removing the soft contents of a cavity, a few granules are allowed to liquify slowly in the cavity, then, by wiping it out with cotton moistened in alcohol, the excavating may be proceeded with, very often painlessly.

I have used it for a few months as a remedy for injecting through the fistulous track of chronic alveolar abscesses, in the proportion of:

Water	oz. ss.
Iodide of Zinc	grs. 24.

It has proven very efficacious in cases of long standing. It is indicated in the treatment of pyorrhœa alveolaris. After the edges of the process and the necks of the teeth have been scraped thoroughly, a wooden point, dipped into a solution of:

Water	oz. ss.
Iodide of Zinc	grs. 12.

and then carefully working it around the necks of the teeth and the edges of the gums, acts admirably; repeating the treatment at intervals of four to eight days, until a cure is effected.

Almost any condition of the gums, depending upon a chronic inflammatory cause, is benefitted dy the local application of this form of zinc in solutions of varying strength; it does not discolor the dentine, so no fear need be entertained in using it for the above mentioned cases. I have had no opportunity of using it in cases of antral disease, but think it would be an excellent remedy for injecting those cavities.—Harlan, *Missouri Dental Journal.*

ILLUSTRATIVE CASES OF DISEASE OF THE EYE ARISING FROM AFFECTIONS OF THE TEETH.

It is a familiar fact that serious disease of the eye may be caused through affections of the fifth nerve in its distribution to distant parts. The following four cases (from the practice of Dr. Roosa and myself) are offered in illustration of the subject, because they were very carefully observed, and because in each one the relation of cause and effect seems unmistakable. In all the affection of the eye appeared to arise from irritation about the teeth.

Case I.—*Paresis of Orbicularis Muscle—Irregular Spasm of Ciliary Muscle—Monocular Diplopia.*—Male, aged twenty-six. Complains that vision of right eye has suddenly become blurred, and that he sees double with that eye. No pain or redness. Pupil small and movable. Fundus normal. Has paresis of right orbicularis; lids cannot be completely closed, and eye is very watery. V.$=\frac{20}{30}$, and with $+\frac{1}{36}$ c. $180^\circ = \frac{20}{20}$. A careful examination of the teeth shows nothing abnormal.

Patient was ordered to take mercury and iodide of potash, which he did for some time without benefit. One night he was seized with severe pain in one of his upper molar teeth. The next day the tooth was extracted, and an abscess which had formed about its root was evacuated. Paresis of orbicularis muscle, diplopia and astigmatism disappeared immediately, and V. became $\frac{20}{20}$ without any glass. There was no doubt about the astigmatism in this case, as the vision was subjected to the most careful tests.

CASE II.—*Paresis of Right Internal Rectus and Ciliary Muscles.*—Male, aged thirty-one. December 15, 1880, complains of blurring and "confusion" of vision of right eye of a week's duration. No redness or pain. Size and movements of pupil normal. Fundus normal. V. $=\frac{20}{20}$, with $+\frac{1}{60}$. Slight paresis of right internal rectus muscle. Slight paresis of accommodation, requiring $+\frac{1}{16}$ to restore normal range.

Root of first molar tooth of upper jaw, right side, is denuded, roughened, and sensitive. Patient was referred to a dentist, and was also treated with mercury and iodide of potash (there being a syphilitic history), and by electricity. Part of the root of the tooth was removed and the remainder filled. The nerve of the tooth was found "dead," and the alveolar process absorbed, but there was extensive suppuration in the adjacent parts. The ocular paresis recovered immediately when the condition of the tooth was corrected (in the latter part of January), the other treatment having been abandoned for some time previously.

CASE III.—*Partial Paresis of Third Nerve*—Female, aged forty. June 3, 1881, complains of confused feeling in right eye, which she cannot describe. Says it began with burning pain in the right ear and the right side of the head.

No redness of eye. Pupil dilated and immovable, and accommodation partially paralyzed. Opacities of both lenses. Teeth on right side are decayed and tender, and gums are in an unhealthful condition. Advised to consult a dentist.

June 9th.—Paresis of third nerve disappeared entirely after extraction of one tooth.

CASE IV.—*Inflammation af Conjunctiva and Sclera* (?).—Male, aged thirty-three. January 20, 1882, complains of painful inflammation of left eye, which he has had for three weeks. Has had "neuralgia" of left side of face, most of the time, for the past month.

There is a patch of inflammation involving conjunctiva, subconjunctival tissue, and appearently the sclerotic, at the lower and outer quadrant of the globe. It is about ten millimetres broad, and extends from the edge of the cornea to the retrotarsal fold. Its appearances are those of the affection ordinarily called episcleritis. There is lachrymation and localized ciliary tenderness. The pupil is small, but movable. Vision and accommodation normal. Fundus normal. Between first and second canine teeth of upper faw, left side, is a small ulcerated patch on the gum. Space between the teeth is very tender upon pressure with probe.

Patient was advised to consult a dentist, who found an exposed nerve in one of the canine teeth just referred to. An application was made to devitalize the nerve, and the facial neuralgia disappeared at once. The ocular inflammation disappeared completely within forty-eight hours. No local treatment for the eye was employed.—ELY, *Medical Record.*

CHLOROFORM AND ETHER.

Two deaths, one from using chloroform and the other from using ether as an anæsthetic, have lately occured on the same day in different parts of the Union. We are accustomed to read of deaths from chloroform even when it has been carefully administered by competent physicians, but it is very rare that ether claims a victim. It is the safest anæsthetic, and statistics show that while 370 well-authenticated deaths have occured from chloroform, there are only 10 which can be attributed to ether. Another calculation gives the number of deaths from ether as one in 23,204 administrations to one in 2,723 from chloroform. With a view of, as it were, striking a balance between the dangers of each alone, experiments have been made of giving the two in combination; but the use of mixed chloroform and ether shows a mortality of one in 5,588 administrations. Chloroform is regarded by the physicians of the hospitals in this city as so treacherous that it has almost entirely been superseded by ether. Three classes of patients bear the administration of chloroform with comparative impunity. It is an excellent anæsthetic for operations on the battlefield, and is then attended with little if any danger; for obstetric purposes it may be safely used, and some believe that it is even safer than ether for children. With these exceptions, the record is all against chloroform.—*The Hour.*

◆

AN INVESTIGATION INTO THE EFFECTS OF ORGANISMS UPON THE TEETH AND ALVEOLAR PORTIONS OF THE JAWS.

The effects of the presence of septic organisms in various parts of the body have been for some years the subject of vigorous discussion and inquiry. Up to the present time certain main facts have, we consider, been placed beyond doubt, and accepted by the general body of scientific men as incontrovertably established. We shall therefore assume as axioms in our present inquiry, the main principles of the antiseptic theory. The object of our inquiry (undertaken some four years ago) has been to determine, as far as possible, to what extent germs are present in the dental tissues when in a state of disease, and to deduce conclusions as to the effects of their presence. The method we have pursued has been threefold:

1. *Microscopical*—The observation of numerous sections of morbid dental tissues, stained in such a manner as to render the germs plainly visible.

2. *Flask Experiments*—The exposure of dental structure in a healthy condition to the action of septic and aseptic fluids.

3. *Clinical Experiments*—The treatment of morbid conditions of the dental tissues with antiseptic agents.

The results of this threefold investigation have uniformly led us to the conviction that germs play an important part in the production and maintenance of morbid conditions of the dental tissues. With regard to the principal calcified dental tissue, dentine, and its destruction by caries, it is necessary to allude, for a moment, to the most commonly received views of the etiology of the latter disease. The old "vital theory" may be passed over, as completely disproved by the successful experiments of M. Magitot and many others, who have produced caries in teeth not in connection with the living body. With regard to the purely chemical theory, we cannot accept it as wholly satisfactory, for the following reasons :—

1. Because the destruction of dentine effected by the action of acids alone, under aseptic conditions, does not resemble caries, either in color or in consistency, it being colorless and gelatinous, the process uniformly attacking all parts of the surface.

2. Because sections of dentine so destroyed show uniform destruction of the matrix, but not enlargement of the channels occupied by the fibrils ; whereas, true caries first attacks the soft tissues, *i. e.*, the fibrils, and encroaches from that *point d' appui* upon the surrounding calcified structure, thereby producing the characteristic enlargement of the channels, until two channels break into one, the intervening matrix being wholly destroyed.

3. That although artificial caries has been produced exactly resembling true caries, we have failed to discover any record of an experiment in which this has been the case when septic influences were excluded. Two experiments have, indeed, been recorded in which the teeth were protected from septic agencies, in one by the addition of creasote (" Tomes' Dental Surgery "), in the other by hermetic sealing of the flask, and in neither of these did caries occur. We assume, therefore, that two factors have always been in operation (1), the action of acids, or (2), the action of germs. Further, our own flasks show that malic and butyric acids, with saliva in a meat infusion, have not, under aseptic conditions, produced caries.

It may be asked, if the tooth has been decalcified by acids out of the mouth, and these acids are constantly in action in the mouth, then if they produce caries, why can they not produce simple decalcification ? To this it may be replied, that acids alone do not destroy a living tissue ; that the stomach is not digested by its own acids until it has been removed from the body.

4. Lastly, we would urge that, when caries occurs in the mouth, it is always under circumstances more favorable to the action of germs than to that of acids. There is always, first of all, a minute pit or haven where germs can rest undisturbed and attack the tissue. We cannot, upon the purely acid hypothesis, explain why the same acids that originally caused the decay, gaining access through some minute imperfection of the armor of enamel, do not in the same mouth, or

under the same condition, attack the wounded enamel at the edges of the filling. The germs cannot rest there, they are constantly washed away if the surface is fairly smooth; but the acids literally bathe the part, except during the performance of the act of mastication, when the alkaline parotid and submaxillary saliva neutralize their action.

These considerations led us to seek for signs of the presence of organisms in carious dentine, with results that far exceeded our expectations.

THE "SEPTIC" THEORY.

This theory—which, for the sake of distinction, may be called "septic"—is rather an amplification of the chemical theory than a contradiction of it. Most probably the work of decalcification is entirely performed by the action of acids, but these acids are, we think, secreted by the germs themselves, and the organic fibril upon which the organisms feed, and in which they multiply, is the scene of the manufacture of their characteristic acids which, in turn, decalcify the matrix, and discolor the whole mass.

From our observation of cementum to which caries has extended, we conclude that the process there is very similar; the bioplasmic contents of the lacunæ and canaliculi afford board and lodging for the organisms, which multiply, and when sufficiently numerous, decalcify the surrounding bone so that the lacuna loses its outline and extends in all directions.

With regard to the pulp, its inflammation does not materially differ from that of any other cellular connective tissue. The influence of germs upon such tissues, when inflamed, has been already demonstrated by Professor Lister. One peculiarity distinquishes this from kindred tissues, and that is that a tooth being an absolutely shut box, its contents are singularly amenable to antiseptic treatment. Having once rendered them aseptic by means of a penetrating agent, it is easy to keep them absolutely so, by sealing the only opening of the cavity with a filling. With a view of testing this fact, the theoretical accuracy of whlch we could not doubt, we have repeatedly allowed the gangrenous contents of a pulp cavity in which suppurative inflammation has gone on, to remain in the tooth covered by a filling.

All that is necessary to prevent further disturbance is to soak them in a powerful antiseptic. I have chosen for this purpose a combination of iodoform and eucalyptus oil, because it is the most powerful and the most permanent in its effects. After a certain period, during which the cavity has been sealed with a temporary filling, if no disturbance has occurred, I have substituted a permanent filling, and almost invariably with the most satisfactory results. This treatment is, I think, eminently conservative surgery and based upon sound surgical principles.

M. Magitot, in a recent most interesting article upon the development of the teeth, lays great stress upon the fact that the odontoblast layer is very essential to the health of the tooth; and if we can, by this method of dealing with the matter, avoid the otherwise necessary alternative of removing it together with all dead matter, we certainly give the tooth an extra chance. The more of the natural vital contents of the pulp cavity we can preserve *in situ* the better for the tooth.

Further, we would propose for your consideration a theory as to what is the probable course of behavior of a tooth pulp under these circumstances; at present only a theory, but one which we hope to establish shortly by occular demonstration, and lay before you in a mature form. Suppose a tooth, with a large cavity communicating with the pulp-chamber; suppose that gangrene and suppuration have extended down two-thirds of the pulp-chamber, and that the extreme periphery of the pulp (membrana eboris), and the contents of the apex of the root alone remain alive; suppose the cavity cleared, a small portion of the surface of the slough removed, and the rest carefully soaked with eucalyptus oil until all the existing organisms are destroyed, and the cavity then filled with a permanent and effectual stopping, what becomes of the slough? In every other part of the body a slough that has been rendered and kept aseptic is gradually absorbed by the neighboring vessels, while new cicatricial connective tissue is laid down in its place; this has been repeatedly demonstrated in sloughs of the limbs treated antiseptically. We therefore suggest that the same thing that happens in other parts of the body, under similar circumstances, happens in the pulp-chamber: the slough is removed gradually by absorption, while its place is supplied by healthy cicatricial tissue; like all scar tissue, it is of a lower order than that which it replaces, but it is a living tissue. After a lapse of time, then, we imagine that, if the tooth in question were extracted and split open, its contents would be found to be a healthy connective tissue, and not a slough at all.

EXPERIMENTS ON THE LIVING SUBJECT.

Taking, then, for granted the facts established by Lister and others, relative to the effects of the presence of organisms in other tissues, we were convinced that the course of an alveolar abscess was also profoundly modified by their presence. An aseptic or a septic alveolar abscess seemed to us to differ very much in the same way as a simple and a compound fracture.

To render such abscesses aseptic, we have injected them with eucalyptus oil and iodoform, and dressed them with lint soaked in these substances.

By means of constant and careful dressings and injections, we have been for the last two years very successful in inducing extensive, and often old-standing alveolar abscesses to run a rapid aseptic course of recovery. Wherever we have failed we have been able to trace our failure to the presence of a sequestrum, which has afforded an inaccessible refuge for organisms, and which, until nature has rejected it, or surgical skill removed it, has kept up the mischief despite all applications. Mr. David Hepburn, in a recent able paper read before the Odontological Society, urged this fact very strongly and clearly, and we quite agree with him that, while dead bone is present, antiseptics may mitigate, but are powerless to annihilate the disease.

MICROSCOPICAL.

The sections from which our observations have been made have been cut from fresh teeth, very shortly after extraction, and without the use of any decalcifying or softening re-agent.

We have subsequently stained them with an aniline dye (methyl violet), following as closely as possible the process recommended by Koch—a process which renders micrococci fairly distinct under a $\frac{1}{8}$ lens, with proper illumination. A few typical slides we have been enabled to show you, owing to the kindness of our friend, Mr. Nelson. I need scarcely add that as the powers are very high oil immersions ($\frac{1}{60}$, $\frac{1}{32}$, $\frac{1}{25}$), we shall ask you to refrain from touching the adjustments. We have also prepared some diagrams illustrating upon a larger scale the appearance of the objects. In dentine, which has occupied most of our attention, we have invariably discovered the channels containing the dentinal fibrils more or less infiltrated with germs—for the most part micrococci, oval and rod-shaped bacteria. These germs we find penetrating, at first in Indian file, then more thickly, along the course of the fibrils. As they accumulate and choke up the channels they encroach upon the matrix, diminishing the distance between the fibrils until the matrix entirely disappears, the neighboring channels join, and the whole tissue becomes one conglomerated mass of organisms. Beyond the sphere of visible decay, sections cut from apparently healthy tissue show here and there a narrow line of micrococci or bacteria, like an advance guard, and such isolated tubes or germs probably penetrate far into tissue which the naked eye would pronounce sound.

In decay which has appeared in blocks of hippopotamus ivory worn on a plate, we have observed very similar appearances, also in some caries which we have produced ourselves in a flask, by exposing a sound tooth to septic agencies.

In cementum hitherto we have experienced some difficulty in obtaining sections of tissue into which caries has penetrated; but where we have succeeded we have found the lacunæ filled with germs. In some lacunæ the protoplasm of the osteoblast cell is slightly stained, the nucleus very deeply, and a few germs are seen scattered about in little groups. In others the protoplasmic contents of the space appear to have been totally destroyed, the outline lost, and the whole lacuna crowded with germs.

SUMMARY.

The preceding observations, together with the experiments with flasks and upon the living subject above referred to, have led us to adopt certain views which may be regarded as an extension of the views previously held upon the matter.

1. We consider that caries is absolutely dependent upon the presence and prolification of organisms. That those organisms attack first the organic material, and feeding upon it, create an acid which removes the lime salt, and that all the differences between caries and simple decalcification by acids is due to the presence and operation of germs. This view we propose to call the "septic theory."

2. That suppuration of the pulp and its sequelæ, such as alveolar abscess, depend also upon the successful working of organisms.

3. We feel justified in concluding that the successful exclusion of germs would prevent the disease, and that their exclusion is quite easy and practicable by the use of powerful and penetrating antiseptic agents, such as eucalyptus oil.

We have found that the space of time allotted to a paper rendered it quite impossible to enter into all the details of treatment and experiment we could have wished. These experiments have extended over three years, and cannot be condensed into a half-hour paper. All, therefore, that we have been able to do has been to lay before you the main facts and a few typical results, and in doing so we have been very kindly assisted by Mr. Nelson, whose microscopical arrangements have enabled us to show you our results in a more perfect manner than would have been otherwise possible.—UNDERWOOD AND MILLES, *Journal of the British Dental Association.*

CRYSTAL GOLD.

DR. TEES.—I have been requested to give my experience with Watts' Crystal Gold. I have been using it for the past ten years, in approximal cavities; and three years ago, when Dr. Watts reduced the price to that of foil, I threw aside gold foil, and have been using crystal gold exclusively ever since - and it has saved me a great deal of time and worriment. With properly serrated points, with the mallet, and by dividing the gold, by means of a sharp razor, into slabs one-sixteenth of an inch in thickness, beautiful results can be accomplished. I have filled cavities with comparative ease with it, into which myself and others have failed to pack gold foil successfully. I cannot lay too much stress upon this manner of dividing the gold, and upon the use of the mallet. Much more gold can be packed into a cavity by the mallet than by hand pressure.

DR. DARBY.—My experience with Watts' Crystal Gold corroborates what Dr. Tees says. I have used it in my practice, more or less, for fifteen or eighteen years. Some of the best operations I have ever made have been done with crystal gold. My objection to it in the past has been its tendency to deterioration when exposed to the air. In large operations and in cavities easy of access, nothing is better than this preparation of gold. I can point to entire crowns restored by its use years ago, and in good condition at the present time.

DR. TEES.—The deterioration is caused by the absorption of moisture, and to restore its cohesive qualities, it should be subjected, for about a minute, to a gentle heat, by placing it upon a piece of thin platina plate or a piece of mica, over a small flame of a spirit lamp.

Dr. Essig.—The purity of crystal gold is insured by its mode of preparation—electrolysis.

This is not the same kind of crystal gold used many years ago. Lamm's gold was made by precipitation in an acid solution, and then adding gum arabic to it; webs of gold appeared, and if certain precautions were not taken, it became powdery.

Dr. Truman.—From some considerable experience in past years with crystal gold, both practically and experimentally, I have not been favorably impressed with it. The difficulty of condensing the crystals properly at the edges, left the filling there in a spongy condition, followed naturally by absorption of the fluids and subsequent discoloration. This defect seemed inherent in the material, and was not apparently dependent on this process of manufacture.—*Dental Office and Laboratory.*

GUTTA PERCHA.

Dentists occasionally complain of gutta percha swelling or bulging from the cavity. This is no new thing; gutta percha will so act in many mouths in *living* teeth, *never* in dead teeth. Line all your cavities with some resinous substance; rosin dissolved in ether is well adapted. Use a small pencil brush, dip in the fluid to fill the dental tubuli, and you will have no further bulging. Work your gutta percha with as low degree of heat as possible. Manipulate your filling until you are convinced that it is sufficiently chilled, then remove all superfluous material. I have known teeth partially filled with gutta percha capped with gold to burst from no other cause than the acids in the dental tubuli acting upon the gutta percha.—*Herald of Dentistry.*

A NEW ANTISEPTIC.

Boroglyceride is a new chemical compound, made by subjecting to prolonged heat, near the boiling point of glycerine, 92 parts of glycerine, to which has been added 62 parts of boracic acid. The mass is tough and deliquescent, and is soluble in water or alcohol. It may be used in substance or in dilution. One part to forty of water is recommended for general purposes, but for dental uses it may be employed of greater strength. It is claimed that this is the most powerful antiseptic known. —*Missouri Dental Journal.*

CONDUCTORIAL.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

This society convenes at Albany the 10th of May, for the purpose of holding its fourteenth annual meeting. The call has not been issued as yet, hence our inability to give particulars; but if what we hear of enthusiastic effort on the part of its officers may be relied upon, there is likely to be a large turn-out of members and delegates, and more than the usual complement of good papers, regular and volunteer.

The several district societies have a duty to perform in this matter that should not be overlooked. They should see to it at their annual meetings, most if not all of which occur this month, that full boards of delegates are elected from members ready to pledge their attendance at the State Society's meeting. Much is lost to the State Society in the way of permanent and delegate membership, papers, and discussion, by electing as delegates members whose only interest in their election is to hear their names read from the minutes and see them in the public prints. The remedy for this, which lies wholly with the district societies, should be vigorously applied, and in such manner as to prevent as far as may be a repetition of what has at times proven a serious drawback to the success of the Albany meetings. Let the rule be—Good men and many of them.

PROCEEDINGS.

The Proceedings of a society, to possess other than shelf-value, should be issued as soon after each meeting as practicable, whether through the journals or in book form. If the latter, then considerations of "proportions commensurate with the dignity and importance of the body" become secondary; in either case, freshness should be primary. The time in which to prepare the average volume and issue it to members should not exceed three months; longer than this is suggestive of something buried. But to do this in the time stated, the publication committee must meet; its members, or a majority of them, must be accessible to each other; and this result is attainable only by the appointment of a majority of the committee, the chairman always included, from the same city. Where members of the committee are appointed from parts of the State distant from each other, as is usually the case in the geographical distribution of offices, it is difficult to get them together and for sufficient time to accomplish anything worthy of mention. And as for the old-time custom of mailing the matter back and forth, it is objectionable in many respects, among which may be named delay, expense, liability to loss, etc. Of a committee of three, two active members from the same place would insure prompt attention to the work, and its careful preparation and early issue to members and others would follow as a necessary consequence.

AMERICAN SOCIETY OF MICROSCOPISTS.

It has been decided by the executive committee to convene the next annual meeting at Elmira, N. Y., August 15th, 1882. There is every indication that the papers, discussions, and exhibits, will fully occupy from three to four days. The President, Dr. George E. Blackham, a king-bee among the "brass and glass" men, has already secured from ten to fifteen good papers, and hopes to more than double this number before the issue of the programme. The "bug and slug" men have responded generously so far to the call for papers, and it is more than probable that at least two-thirds of the work will come from their side. The local society at Elmira is making great preparations for the event, and is ably seconded in its efforts by citizens generally and the press. There is no good reason why dentistry should not be well represented at the meeting, and make a good exhibit in the published proceedings. Circulars giving particulars may be had by addressing Prof. D. S. Kellicott, Buffalo, or Dr. Thad. S. Up De Graffe, Elmira.

NEW DENTAL JOURNALS.

The first of these is the *New England Journal of Dentistry*, edited by "Associated Dentists," with Chas. Mayr, A. M., B. S., as "Scientific Editor." It is a thirty-two page monthly published at Springfield, Mass. The first three numbers speak well for the originality and industry of those engaged in the enterprise.

The other new comer, the *Southern Dental Journal*, hails from Atlanta, Ga. It starts out as a monthly of forty-four pages, edited by B. H. Catching, D. D. S., and published by R. A. Holliday. The first and second numbers, or all that have been issued up to the present, contain interesting original communications and selections.

DENTAL COLLEGE COMMENCEMENTS.

The commencement exercises of the Philidelphia Dental College were held at the Academy of Music, March 1st. Prof. J. Foster Flagg addressed the graduates, and Dr. Lean F. Head delivered the valedictory. The matriculants numbered 138; the graduates, 52.

The Baltimore College of Dental Surgery's commencement exercises occurred March 9th, at Ford's Opera House. The "annual oration" was by Prof. Richard F. Gundry, M. D.; the valedictory by Dr. John S. Bizzell. The number of matriculants is given as 93; of graduates, 47.

DR. M. S. DEAN.

Died, Chicago, Ill., January 28th, 1882, Mason Stillman Dean, D. D. S., in the 57th year of his age.

It is with great sadness that, in this number, we record the death of Dr. M. S. Dean, of Chicago. No event of recent date has occurred in our profession that has called forth such a universal expression of sorrow. Dr. Dean was highly esteemed, both for personal worth and his professional attainments. * * * If to live beloved and die universally lamented; if to terminate a well-spent life in a serene and tranquil way, is a consolation to those that remain, then may the friends of Dr. Dean console themselves with the gratifying reflection that few have gone so peacefully, and fewer still have left behind pleasanter memories or a better name.—*Missouri Dental Journal.*

As a man he was possessed of a keen sense of justice, and was strictly upright in all his dealings. Dignified and self-respecting; kind and considerate to others; intelligent, accomplished and genial in his intercourse, he won the affection and held the confidence of all who knew him. Dying, he has left probably not one to cherish an unkind remembrance of him.—*Dental Cosmos.*

In the life of our friend we may read the history of a lofty ambition never prostituted to selfish ends, but pursued for the advancement of his chosen profession and the benefit of his fellowmen, and while we cannot understand the decree that took him from us in the height of his usefulness, we are grateful for the tenderness which tempered the blow, and permitted his life to close so peacefully, without one sigh of pain.—*Chicago Dental Society.*

Few practitioners of dentistry have devoted their time and talents to the study and investigation of the more abstruse and occult branches of dental science, to the extent that Dr. Dean has done. The results of his labors in this direction have served in an eminent degree to familiarize dentists with the subjects of his particular line of study, and thus to largely promote a more general knowledge of this branch of dental science.—*St. Louis Dental Club.*

Yea, verily! for even though no widow's wail is around the bier, no orphan's tears glistened on the lids of bereaved childhood, no brother's or sister's lamentings resound, and no parent's fervent prayers ascend from the now deserted chamber, where our friend was all alone with death, yet was there no lack of mourners. Friends by the hundred, bretheren by the score, lament the loss sustained and feel the grief caused by the departure of Dr. M. S. Dean.—*Ohio State Journal of Dental Science.*

PELLETS.

Number 1 of volume III., 4,000 copies.

Crystal gold is again coming to the front.

Buffalo's "Doctor's Day" (Feb 21st) was a grand success.

Nachet, known to fame as a maker of microscopes, is dead.

Tait pronounces Listerism, "one of the largest, best-blown and most attractive bubbles ever displayed to a surgical audience."

Dr. Geo. W. Field has opened an office in Baltimore. We also learn that he has been made an associate on the editorial staff of the *Independent Practitioner.*

Abbey, well known to dentists of a quarter of a century ago as the manufacturer of "old-fashioned soft gold foil," died December 28th, 1881, aged 84 years.

The most behind-hand publication in the country is the *American Journal of Microscopy.* The November number's "news" is just four months old. What's the matter?

The following statement is credited to Magitot: "A peculiar osteo-periostitis of the alveolar border of the jaw is a constant, early and pathognomonic sign of diabetes mellitus."

The *Dental Cosmos* says: "There are now seventeen periodicals, good (thanks), bad, and indifferent, devoted to dentistry, published in this country—eleven monthlies and six quarterlies."

The manufacturers of and dealers in dental goods have resolved themselves into a sort of trades-union. Circulars announcing the first advance were mailed to members of the profession a month ago.

Dr. O. E. Hill, President of the Dental Society of the State of New York, is doing everything possible to made the coming annual meeting surpass in interest the best of its predecessors. Official dignity and hard work go hand in hand, and in the case in question the result is necessarily far from problematical.

The publication of Dr. C. F. M. Böedecker's paper on "The Minute Anatomy of the Dental Pulp," read at the March meeting of the New York Odontological Society, will be heartily welcomed by dental histologists as a timely contribution to a not over well understood subject, and particularly so by those who know the essayist as a patient and expert investigator.

It will be good news to those who wish to couple photography with microscopy, to learn that Mr. William H. Walker, the calls for whose pocket cameras have been so numerous as to make it difficult to fill orders as fast as received, has just perfected photographic apparatus for the making of photo-micrographs. Like his pocket camera, it will be compact, accurate, effective, and comparatively inexpensive. The first public exhibit will be made this month.

BOOKS, PAMPHLETS. PERIODICALS.

Since our last issue we have received the following: The Dental Cosmos, Medical Record (weekly), Missouri Dental Journal, Medical Brief, Ohio State Journal of Dental Science, Stoddart's Review, and New England Journal of Dentistry, all for the months of January, February and March; The Dental Headlight, and Dental Office and Laboratory for January; The Dental Luminary, College and Clinical Record, Dental Register, and Independent Practitioner for February; and the Southern Dental Journal for February and March.

THE

ODONTOGRAPHIC JOURNAL.

VOLUME III.—*July*, 1882.—2.

BACTERIA AS BENEFICIAL AND NOXIOUS AGENTS.

BY CHAS. S. DOLLEY, M. D., ROCHESTER, N. Y.

[*Read before the Rochester Society of Natural Sciences.*]

Although the organisms which we are about to consider this evening have been known and studied for many years, it is only within the last decade or so that they have awakened any great interest in the scientific and popular mind. Since the promulgation of the germ theory of disease especial attention has been paid them, they have had frequently to shift their position in organic classification, and have had many true, but more false attributes laid at their door. Even at the advanced stage which science has reached to-day we are unable fully to comprehend their true relations to the various phenomena, both normal and pathological, with which we find them associated.

The popular idea of their nature is a vague one, the import of their presence being in many instances exaggerated, although often overlooked to the detriment of public and private health. After having for some time vacillated between the animal and vegetal kingdoms, they were set apart by the great German Naturalist, Hackel, in a kingdom created for their special benefit—the *Protista*. This however did not satisfy modern phylogenists and true to their restless character *Bacteria* again began a movement which has ended in their vegetal nature being well established. That they are plants is now the unanimous verdict of scientists, although their true position among cryptogamic plants still remains a mooted point. Cohn maintains their algal nature; though admitting a close relationship to the fungi, in their lack of Chlorophyll. Sachs seems to have solved the question by uniting the algæ and fungi in a single group the Thallophytes, in which he establishes two paralell series, one comprising forms possessing chlorophyll, the other forms destitute of it.

Accepting then their plant nature, and leaving naturalists to settle their exact phylogenitic relationships, let us proceed to the consideration of some of the more salient characteristics of these the smallest of all organisms, either animal or vegetal. Strictly speaking the term *Bacteria* signifies a little rod or staff, but bacteria vary in form from globose to linear, and may be separated into several groups or genera, according to their peculiar shape.

While the term Bacteria still stands as the popular designation of the family, it is more strictly, limited as a generic term indicating that form which is short and rod-like in appearance, i. e. *Bacterium.* That form exhibiting a round or oval contour is denoted by the term (*sphærobacterium*) *Micrococcus.*

The long stiff fibre-like form is signified by the term *Bacillus*, while that form which while long and fibre-like is at the same time flexible, is called *Spirochaete.*

Other filamentous forms may be stiff and fibre-like, but twisted like minute corkscrews, or yet merely wavy or curl-like. They are therefore designated respectfully by the terms *vibrio* or *spirillum.*

In size we have already characterized bacteria as the smallest of living organisms. This is, so far as our best lenses tell us, true: and beyond them life does not exist. Their germs or spores are undoubtedly the smallest particles into which protoplasm is capable of being divided, and still retain its bioplastic properties.

Were it not that they live in such masses their existence would probably have remained unknown. A cube the size of a pin head would contain about six hundred and thirty-three millions of rod bacteria, and they increase with such rapidity that Cohn has calculated that the bacteria which spring from one germ, would in less than five days fill the whole world's seas completely full. Bacteria multiply both by fission and endogenous cell-formation.

An individual in the first case, after increasing somewhat in size, begins to undergo hourglass contraction, untill finally breaking in two in the middle, two individuals are set free, which in their turn undergo the same process. In the second method, the central protoplasm of the individual becomes broken up into minute spherical bodies or spores which after a time are set free and under favorable circumstances develop into organisms identical with that from which they originated. The greater proportion of bacteria are transparent, and colorless, but some forms of *Micrococci* or spherical bacteria assume the most brilliant tints, from a deep blood red to a beautiful golden yellow. These are termed the pigmentary bacteria (*Micrococci chromogenes*), and occur usually upon cooked alimentary substances, as the hard white of eggs or cooked potatoes, which have been left exposed in dark, damp places. At times the variety secreting the red pigment, has given rise to much excitement, being considered as a miraculous indication of coming calamity, of divine wrath or of "secret guilt calling for bloody atonement." The coloring material of these pigmentary bacteria is closely allied in a chemical way to the aniline dyes so largely used at the present time.

We have thus run hastily over some of the more important points in regard to the organization of bacteria. We know there are such organisms, that they assume a limited number of shapes, easily recognizable under the microscope, that they develop with the most wonderful rapidity, and that they develop in certain instances in such a manner that their presence may be known by the unaided eye.

What now is their economic value? Do they have any useful office to fill, or must we deem them but a scourge and plague, and of no direct benefit to man. Scarcely that: their importance in the economy of nature is as grand as is their power of development, and while at times we find ourselves compelled to use all the resources of medical skill to combat their influence, on the other hand we at times cultivate them most assiduously and could ill afford to have them join the ranks of extinct organisms. Before, however, taking up those points which are settled, and in which we have become convinced of their value, let us look back into an early epoch of terrestrial history, and view the great service which scientific hypothesis has intimated may have been theirs to perform.

THE PLACE OF BACTERIA IN THE EVOLUTION OF ORGANIC FORMS.

Omne vivum ex vivo, that all life is derived from preexisting life, is a motto which has come to be almost universally accepted among modern biologists. Now geologists have as universally decided that at an early period of the earth's history, life did not and could not exist. Had protoplasm been rained upon the earth at that period, in storms more terrible than those which later on gave Noah an opportunity of assisting in the survival of some of the most unfit, as well as of the fittest creatures; it would long before even reaching the proximity of what is now our atmosphere have been broken up by the fervid heat into its ultimate gases, to be again diffused throughout the universe. Later on we are informed that the molten mass cooled down to such an extent, that after a condensation of the vapors, waters appeared. Soon after this we have described to us, a period in which plant and animal life literally teems in the damp tropical atmosphere, but geologists fail to inform us from whence all this life comes. The exact scientist stops here—for lack of evidence; but those with minds more imaginative step in, and fill up the period between the chaotic stage and that in which the world is suddenly found prolific with life, on the one hand by accepting Hebrew traditions, or or the other by claiming, that in the process of cooling certain gases and bases of a high rate of molecular motion united to form compounds, in which the combined molecular activity was such as constitutes life. At this point they resume the more settled paths of science and allow these spontaneously evolved germs, these "aesthetophores,"* to develop according to the admitted laws of evolution. Bnt how about our motto *omne vivum ex vivo*. This may not stand, if we accept either the hypothesis of Hebrew tradition on the one hand, or that of Bastian and Pouchet on the other. We have but one alternative, and that is to frame an hypothesis that will introduce life to the world without creating it *de novo* either by the spontaneous combinations of chemical equivalents, or by one or more direct acts of the Infinite. We must have life from preexisting life, we know there could have been none on this globe, hence we conclude it must have come from without, from some planet which was at that time capable of and in the act of sustaining life.

---

* E. D. Cope. "Evolution Number" of *American Naturalist*. May, 1882.

We have much evidence that myriads of minute organisms are carried about in the air. Tyndall confirms this by his experiments.* He says:—"The air of our London rooms is loaded with organic dust. Nor is the country air free from its presence. How ever ordinary daylight may permit it to disguise itself, a sufficiently powerful beam causes dust suspended in air to appear almost as a semi-solid. Nobody could, in the first instance, without repugnance, place the mouth at the illuminated focus of the electric beam and inhale the thickly massed dust revealed there. Nor is the repugnance abolished by the reflection that although we do not see the floating particles, we are taking them into our lungs every hour and minute of our lives."

Aeronauts have collected, with properly prepared apparatus, great numbers of bacteria and other vegetable spores, at the highest altitudes —and it is claimed that the minute circular or spherical siliceous bodies found in atmospheric dust, are fossils, that " they are the micrococci of another age."†

The sun very frequently reveals to the aerial voyager great quantities of spider-web filaments scintillating in the rarified air of his highest journey. Rome has been showered with the sands of Sahara, and France with South American diatoms. These facts, together with certain cosmical appearances of light, lead as to suppose the existence of a world dust, and it is easy to believe that many organisms or spores may be carried by ascending currents of air, so far that, losing the attraction of this planet, they float about in space, until again attracted towards our own or some other sphere, when they may or may not, find conditions favorable to further development.

Analogy alone, would lead us to believe that there are or have been, other planets capable of sustaining life, and now this belief is receiving confirmation in the shape of discoveries of meteoric fossil organisms the organic character of which, though at first disputed, has recently been corroborated by several eminent scientists. This, then, may have been the first capacity in which bacteria evinced their power on earth, and these forms which we may every day see under our object-glasses, are in great probability, together with ourselves and all other animal and vegetal life of to-day, the direct and indirect descendants of these pioneer germs of terrestrial life. Let us now notice some of the more ordinary methods in which these potent little particles act beneficially.

---

* In a discourse on "Dust and Disease"—*Fragments of Science*, John Tyndall. Also, M. Pierre Miguel's articles in Brebissonia on "Organized Dust of the Atmosphere."

† Dr. T. L. Phipson, T. C. S., "On the Grains of Silica and Micrococci in the atmosphere, *Scientific American Supplement*, No. 272.

THE AGENCY OF BACTERIA IN MATERIAL METAMORPHOSIS.

In the matter of nutrition:—we find the materials of both organic and inorganic nature called into play. The great bulk of the plant world derives its nourishment from inorganic matter, the plants taking the crude materials as they are furnished in the salts of the soil, elaborates them in its cells and forms from them its cellulose, its starch, its chlorophyll and its diastase. On the other hand animal life depends in as great a degree upon materials which have been already elaborated by vegetal chemism. It depends mainly upon the plant's starch and gluten, in one shape or another. Either taking them direct, or in the case of carnivorous animals, simply taking the results of their assimilation by others. Now suppose this double drain upon inorganic nature were to continue with no return. How long would it be possible for life to exist? Our farmers have learned, many of them rather late, that they cannot demand food from the soil, without rendering some return. They must, in the shape of fertilizers of one kind or another, begin paying back a tribute of which their ancestors thought to defraud the earth which gave them bread.

What are these fertilizers? No more than materials which have completed what we may call the circle of nutrition. Materials have been taken from the earth in the first place to form plant tissue, this in its turn, has been appropriated by the animal economy and these very animals yield themselves up at last, in the shape of super-phosphates, etc., to the soil, which takes back its own.

This seems simple enough, but it is not spontaneous. We know of beef being sent from Australia to England and reaching that country as fresh as though but just from the English *abattoirs.* We wish fresh fruits out of season and we have only to step to our cup-boards or to the store and to obtain that, which retains all the flavor of freshly cooked fruit. How is this, simply because we have been able to exclude from the meat and from the fruit, these very little organisms which we are considering this evening. We have either excluded them entirely or rendered them temporarily inactive by reducing the surrounding temperature. But let us open our fruit cans, or expose the meat during its voyage, for a few hours only, to the warm air and we find it rapidly under-going change, on the one hand, fermentation, on the other, putrifaction, two phenomena invariably accompanied by the presence of bacteria and ceasing upon their abstraction.

We therefore find these minute organisms performing another grand service in nature's economy by completing the great circle of nutrition, causing by their presence, organic bodies to be hastily broken up into their inorganic elements, that they may once more begin the ever-lasting cycle; and were it not for bacteria, as Cohn puts it, "the material embodied in animals and plants of one generation, would, after their decease, remain bound, as are the chemical combinations in the rocks, new life could develop because there would be a lack of body material."

All bacteria are not ferment bacteria, neither do all attend putrefaction, but particular varieties invariable accompany each of these processes. We might continue with many interesting details of their minor beneficent qualities, as regards their relation to the litmus of the chemist or to the cheese and saurkraut of the German.

BACTERIA NOT THE *CONTAGIUM VIVUM*, BUT THE POSSIBLE CARRIERS OF SEPTIC MATTER.

But let us now take up that phase of their influence which is baneful, and which has only began to be appreciated within the last few years, chiefly through the labors of Sir Henry Holland, Pasteur, Klebs, Koch and Lister.

In speaking of the value of Pasteur's discoveries, Prof. Huxley says: "They fully balance the ransom of £200,000,000 paid by France to Germany, after the war of 1870-71." How, we shall notice more fully further on.

For some years past it has been found that certain forms of bacteria are constant attendants upon certain morbid processes both in man and animals. The question has naturally arisen, are they mere accompaniers of the diseased condition, or does it arise in consequence of their presence? In answer to this question much has been, and still may be said on both sides.

The great danger however, of new discoveries, is that on the one hand, half truths are accepted as whole ones, and on the other, dogged scepticism and ignorant ridicule meet the investigator at every step, his best demonstrated facts being classed with those which he admits as merely probable. It has been thus with the advocates of the germ theory, and at the last International Medical convention in London, the father of antiseptic surgery—Lister—was obliged to protest against the extremes to which the advocates of the germ theory were carrying their ideas.

While we do find, as we have already remarked, particular varieties of bacteria attending certain diseases, and while they, in one sense, undoubtedly cause the disease, in another they do not, for we may introduce into the system the identical variety of bacteria, but which has been cultivated under different conditions and we find no evil effects following. The truth of the matter seems to be that bacteria act merely as the carriers of contagious matter. After reviewing a somewhat extended course of reading in relation to this subject, and taking into consideration many practical points gained in the pathological laboratories of Drs. Wood and Formad, who have been for some years past, studying the relation of bacteria to diphtheria, for the national board of health, I can but believe that it is not the action of the organisms themselves, but rather the morbid, septic material, with which they are saturated through their assimilation of certain noxious substances, which causes the pathological changes noted upon their introduction into the system—the disease varying with the peculiar conditions under which the germs have been cultivated. We know that plants and animals readily absorb materials in solutions of which they are immersed. It is easy to understand therefore, how bacteria, nurtured in solutions of unusually noxious materials, in organic substances undergoing rapid retrograde changes; and we have seen that it is their special duty to bring about just these changes—may, in their turn, become completely saturated with the poisonous gases and effluvia in which they are bathed.

Suppose that especially large quantities of these germs, poison saturated, are taken into the system, either by directly entering the circulation at abraded points, or by being brought into intimate relation with the blood by being inhaled into the lung. Is it any wonder that the blood in its turn should be contaminated by the infectious matter with which they are laden. No, this seems probable enough - for while Tyndall and others have shown that multitudes of these germs are taken into the lungs at every inhalation, they have also shown that expired air is free from them, since they have been taken up by the minute ciliary brushes of the bronchi and bronchioles. Again it is a settled fact that germs which are known to be of deadly potency, may be by cultivation in innocuous media, so relieved of their septic properties as to be introduced into the blood with impunity. Pasteur, the greatest of living microbists, in speaking of his experiments on chicken cholera,[*] says, "We may notice that it is possible to prepare cultures of varying degrees of virulence. One preparation will kill eight fowls out of ten, another five out of ten, another one out of ten, another none at all, although the microbe may still be cultivated * * the attenuated microbe having almost the bulk, the form, and the appearance of the most virulent microbes"—that is they have not lost a single optical characteristic; they are as true types of their species as ever. Thus he asks in another place,[†] "Does their shape and aspect change, while their virulence is changing in such a marked manner? I would not dare to affirm that there does not exist certain morphological relations, between the parasites and the various degrees of virulence which they show, but I must confess that it has not been possible for me to seize them. If any such relations should appear, they disappear to the eye, working through a miscroscope on account of the extreme minuteness of the virus, the cultivations seem to be the same for all degrees of virulence. If sometimes slight changes are seen, they seem to be entirely accidental, for in the next cultivation they either disappear or even sometimes inverse changes take place." We see that they have been washed of their poisonous material." It is the oxygen of the air which attenuates and extinguishes the virulence.[‡] This accounts for the slow progress with which contagious diseases travel, and which has been offered as an argument against their pathological agency. It also accounts for the spontaneous cessation of epidemics.

Advantage has been taken of this possibility of attenuating their virulence to render through innoculation both men and animals proof against certain diseases; for having been rendered sufficiently ill by an attenuated virus, they will when innoculated with virulent virus suffer no evil effects, or only effects of a transient character. In this connection Sir James Paget speaking of Pasteur, says: "He has done for the lower animals, that which Jenner has done for the human race." We may find constantly in the human body bacteria of various kinds, and yet we suffer no ill effects. Thus in the mouth have been found* *Micrococci*, *Bacillus subtilis*, *Bacterium termo*, *Sarcini Ventriculi*. *Spirochæte plicatilis*, *Leptothrix*, and a large form of *Spirillum*. The coating often noticed upon the tongue is largely made up of them. They exist in quantities upon the teeth, and are constantly found upon the mucous membranes of the entire respiratory and gastro-intestinal tract.

---

[*] Address before the International Medical Congress, Aug. 8, '81.

[†] L. Pasteur "On the Attenuation of the Virus of Chicken Cholera." *Comptes-Rendus de Academy des Sciences*, Oct. 25, 1881.

[‡] Pasteur, *loc. cit.*

AGENCY OF DIFFERENT FORMS OF BACTERIA IN THE PRODUCTION OF VARIOUS DISEASES.

But let us for an instance take up our residence in the town of Ludington, on the east shore of Lake Michigan, a center of the lumber trade, producing annually enormous amounts of sawdust, part of the town being built upon a swamp which has been filled largely with the great staple of the place, i. e. sawdust. The drainage is so bad that in many places a hole dug a couple of feet in the ground soon fills with water, and only in a small percentage of the houses has any attempt been made to construct cellars. During 1880 and 1881 diphtheria appeared in the low region and spread with such thoroughness that it is said scarcely a child escaped an attack and about one-third of them died, (33⅓ per cent.). Dr. Formad who was sent to Ludington to make studies there in regard to the disease and with special reference to the micrococcus question has given the above description of the place.† Here we will be exposed to inoculation through inhalation and otherwise, by bacteria, which have been nurtured in rapidly fermenting and decaying organic matter, and with ninety-nine chances in one hundred that they will produce in us all the phenomena of diphtheria. Under the microscope however no difference can be noticed between these micrococci and those ordinarily found in the mouth, yet they have been distinguished as *micrococci diphtheritica*. To bring the matter to our own doors, let us glance at a number of cases of typhoid fever that only a few years since were all traced to the sufferers having drank from a certain well on the west side of the Genesee, strongly contaminated with sewage. Here the organisms instead of being inhaled and producing primarily a local irritation of the respiratory tract, were taken into the gastro intestinal canal, with the effect of producing a fever, the most characteristic features of which are its intestinal lesions. Now again we see their direct action, and still these same *bacilli*, while in no way differing structurally from *bacilli* which we may any of us cultivate and observe in putrefying solutions of animal matter, have been given the distinctive appellation of *Bacillus typhi abdominalis* (Klebs, Ebert). This I deem a partial mistake, they are distinct from ordinary *bacilli* in that they have become saturated with the more actively poisonous results of putrefaction, and have been taken into the body in large quantities, causing intense local symptoms at their first stopping point in the system: they being usually taken in fluids, which through the agency of the *cravate de suisse* pass at once to the small intestine without stopping in the stomach. And yet they are the same as the ordinary variety in all their microscopic characteristics and by proper culture may be rendered comparatively harmless. Let us therefore get a correct notion in regard to these agents of disease. In themselves innocuous; they may become under conditions in which poisonous products are being rapidly evolved, most dangerous by acting as carriers of the peculiar contagium in which they have been bathed and which may be the result of their assimilation of certain devitilized organic materials. I might easily enlarge upon this subject, but the examples I have given seem sufficient to illustrate the point, and we will now run as hastily as possible over the list of diseases in which bacteria are considered to act as causative agents. Beginning with those cases in which *Micrococci* or spherical bacteria are chiefly found, we will next glance at those in which the other forms, both rod and fibre-like, are the active causes.

---

* H. T. Batlin, Journal of the Royal Microscopical Society, 1879, p. 756. Beale, " Disease Germs," London, 1872.

† Supplement No. 7, *National Board of Health Bulletin.*

In diphtheria we have already referred to the power of spherical bacteria—they are usually associated with the retrograde changes of vegetal matter and it is where this is especially active, that we find the disease of the greatest malignancy. Attacking that part of the body most exposed to inoculation by inhalation, namely the pharynx; and the mucous membrane of this region being thickly underlaid with lymphatics, their poisonous material is rapidly absorbed, and we have produced from the local irritation, excessive glandular secretion which on account of the close adherence of the squamous epithelum of the part can not be readily thrown off, and forms grayish white patches, which we call diphtheritic.

By auto-inoculation the disease may extend to the larynx and other adjacent parts, or it may originate in the larynx. The epithelium here being columnar ciliated, we obtain a membrane which is readily loosened, and we call it croupous, the membranes of true croup and diphtheria, being identical in their origin and character, both being caused by the local inoculation of septic material carried by micrococci, and the severity of the constitutional symptoms in one and their mildness in the other, is readily explained when we understand thoroughly, the histology of the parts. The poisoned secretions are held down in the one case, by a firmly adherent squamous epithelium upon a region rich in lymphatics, while in the other, the secretions are more readily thrown off, as we have remarked, and if not thrown off, are not so fully absorbed on account of the poverty of the parts in lymphatics. Leaving diphtheria, we find spherical bacteria playing their part again in various inflammatory processes. Especially those which do not tend towards suppuration, as rheumatic affections and their sequalæ, affecting the heart, liver and kidney. In erysipelas, where the poison again shows its local irritating effect—this disease being regarded as an inflammation of the minutely distributed lymphatic vessels of the skin. In *pyœmia* and *septicœmia*, when the secretions are found crowded with them, in connection with other forms which Pasteur* regards as identical with his *Septic Vibrio.* So much having been said of these diseases during the late president's illness, I may be allowed to remark that these two diseases, together with that called sepsin poisoning, may be considered identical, differing only in the degree in which the putrid materials, carried by the inoculating bacteria, or without their aid, is absorbed. If sufficient be absorbed to excite destructive suppuration in parts to which it is carried by the circulation, it is considered to be *pyœmia.* If, however, we have no multiple metastatic abscessess, but all the other symptoms of putrid infection, we term the disease *septicœmia*, or sepsin poisoning. In epidemic puerpural fevers and in *Parotities epidemica* or mumps, we again see the power of these minute organisms as carriers of infecting material. Among the eruptive fevers, they act most powerfully. In scarlatina they are found in and upon the blood corpuscles. In measles they seem to carry some poison which is both abundant and powerful, for while one of the most common, it is one of the most contagious of diseases. But of this class of diseases we are, perhaps, most interested in *variola*, or small-pox. Here we have found the benefit of using these carriers of disease for its prevention. The *micrococci* which are found in a small-pox pustule are identical with those which we may any of us examine, by moistening in tepid water one of the points used in vaccination and placing the softened lymph under our glass ; and while in vaccination we convey to the patient a mild form of the disease as found in animals, yet the bacteria of malignant small-pox differ in no way, except in the virulence of the poison which they convey.

---

* "La Theorie des Germes," *Receuil de Med. Vet.*, 1878, p. 513.

Right here we might refer to the danger of conveying disease from cattle to man in using bovine virus for vaccination.* The danger of this is extremely slight when proper care is used in the selection of healthy animals. Only one disease has been known to have been communicated in this way, this resembling *herpes circinatus*, has occurred about fifty times out of the hundreds of thousands of cases of vaccination ; and every case was traced to virus obtained from irresponsible producers.

Of diseases which *might* be thus communicated the first is anthrax, or malignant pustule ; this is, however, so easily recognized in the animal, that there could be no possible danger of its being mistaken for a spontaneous cow-pox pustule. Tuberculosis might possibly be inoculated, but the possibility is extremely remote as the serum is innocuous, the tuberculous matter itself being requisite. Lastly, epizootic apthæ, or the foot and mouth disease, an acute infectious disorder of cattle, might be inoculated, but luckily it is almost entirely unknown in this country, although common in England. The last class of diseases in which we find the spherical bacteria is that of the infective tumors of tuberculosis, glanders, farcy and specific diseases. But as we shall see further on, *micrococci* may be the carriers of certain morbid agents in common with other forms of bacteria, and we shall refer to them in these relations.

But before leaving these little spherical germs we will, by referring to to them in connection with Pasteur's researches into the nature and cause of the great silk worm disease known as *Pebrine*, which decimates that insect species, as cholera slays its human thousands, discover " how a zoological study saved the commercial prosperity of France. Prior to Pasteur's researches, the silk worms died in multitudes from the mysterious epidemic, and blank ruin stared the silk growers and cultivators in the face. When, however, by careful study, Pasteur had made himself master of the situation and had found that a minute plant organism, propagating itself within the bodies of the silk worms and readily conveyed from one to the other, was the cause of the disorder, his countrymen fully realized the truth of the proverb that ' Knowledge is power,' and that to scientific research was due the salvation of their commerce and the rescue of their happiness and prosperity."* Among animals the contagium of chicken cholera is also carried by a spherical bacterium, and by obtaining diluted cultures of this virus through exposure to the air for stated periods, Pasteur has been enabled to furnish a virus which protects fowls from the more malignant form of the disease, thus holding it under control in France.

---

* "Transmission of Bovine Diseases," in *Med. News* for May, 1882, p. 522–549.

Among other forms of bacteria associated with disease, we may mention the *Bacillus* of intestinal and eruptive Typhoid Fever, *Bacilli typhi abdominalis* (Klebs and Ebert), *Bacillus typhi exanthematic* (Klebs). Of Anthrax, *Bacillus Anthracis* (Cohn). Of Gastritis, *bacillaris.* Of Leprosy, *Baccillus leprosus* (Neisser). Of consumption, the newly discovered *Baccillus Tuberculosis* (Koch). All these among men; and of the Swine plague, *Bacillus Suis* among animals. Next the *Vibrions* of Cholera and Dysentery, *Vibrio rugula* (Pouchet). The Spirochæte of Relapsing fever, *Spirochaete Obermeiri* (Cohn)—which does not differ in form, size or movement from the *Spirochaete plicatilis* found during health in the mouth. Still another fibre-like form, the *Streptothrix Fœrsteri* (Cohn) is found in concretions within the lachrymal duct of man. In nearly every one of the above list of diseases, some form of the genus *Bacterium* has also been found, and in many cases *micrococci* coexist and are claimed by some as equally fruitful sources of the respective diseases. That this is the case in most instances I have little doubt. For it may be that while the contagia of disease is neither a soluble inorganie septic ferment,nor a specialized form of bioplasm, neither is it a parasitic organism, but rather a septic product of the assimilation by these organisms of morbid aliment. The same order of foods producing the same disease when ever the bacteria which have lived on them come in contact with mucous or other surfaces capable of rapid absorption, in sufficiently large quantities, producing thereby either local symptoms alone, or local and constitutional symptoms of varying gravity in proportion to the amount of septic matter absorbed and the tonicity of the patient, the peculiar disease being capable of transmission by means of any form of bacteria which may have been present and become saturated with its septic products.

---

* "Wilson's *Leisure Time Studies.*"

IS TOBACCO AN ANTISEPTIC?

BY FRANK FRENCH, M. D. S., ROCHESTER, N. Y.

[*Read before the Seventh District Dental Society, April, 1882.*]

"When all things were made, none was made better than tobacco, to be a lone man's companion, a bachelor's friend, a hungry man's food, a sad man's cordial, a wakeful man's sleep, and a chilly man's fire; while for stanching of wounds, purging of rheum, and settling of the stomach, there's no herb like it under the canopy of heaven." So spake old Salvation Yeo many long years ago, and thousands to-day will say amen! to it.

Tobacco, that "precious stinke," as his vindictive majesty King James, called it, first because known to Europeans shortly after the discovery of America. All its present popular uses were probably known to the natives of North and South America, ages before Columbus was born. When the Spaniards landed in Paraguay, in 1503, the natives came forth to oppose them, "beating drums, throwing water, and chewing tobacco and spirting the juice from their mouths upon the invaders" which as a means of defense and offense, must have been a painful surprise to the Spaniards, if the Indians had anything of the accuracy of aim said to be attained by some of our western friends.

Tobacco was no sooner introduced, than it was seized upon by the medical faculty as a valuable addition to their pharmacopeia. In a volume published by Henry Butler he says "It cureth any griefe, dolour, imposthume, or obstruction, proceeding of colde or winde, especially in the head or breast. The fume taken in a pipe is good against rumes, catarrhs, hoarseness, ache in the head, stomach, lungs, breast; also in want of meate, drinke, sleepe or reste." But very soon its opponents began a war against it and the battle which began two centuries ago continues still. King James imposed the first tax on tobacco: in Russia smoking was punished by amputation of the nose; in the Swiss Canton of Berne the offense ranked next to adultery. Innocent XII in 1690 solemnly excommunicated all who should take snuff or tobacco in church.

It is not my purpose to extol tobacco; and I love it too well to decry it, so that what I have to say will be in its connection with our specialty, and is by no means intended as a tirade against it. I have tried to destroy as much of it as possible by burning it and I expect to keep trying as long as I live.

Tobacco contains nicotine in certain proportions, which is of itself *after* distillation, alkaline. As it exists in tobacco it is combined in *excess* with acid—10,000 parts of fresh leaves containing only six parts of nictotine, but fifty-one parts of mallic acid, and nine parts of nitric acid combined with other substances. In its concentrated form its action upon the animal system is one of the most virulent poisons known, one drop being sufficient to kill a dog, and destroying life in man in poisonous doses in from two to five minutes. Havana tobacco contains 2 per cent. of nicotine, Maryland 2.3 per cent., and Virginia 6.9 per cent., but these are from fresh leaves, and tobacco undergoes considerable chemical change in the process of curing, it being asserted that there is a much greater proportion of nicotine in prepared tobacco, than in fresh leaves. A fermentation takes place which converts certain pre-existing principles into nicotine. Another change is produced in burning it, as high as 9 per cent. of nicotine having been obtained by this process. The odorous principle of tobacco is said to be due to nicotine. The smoke contains Sulphuretted Hydrogen and Hydrocianic Acid in small quantities.

In connection with many others, when asked by my patients in regard to the effects of tobacco upon the teeth, I have been accustomed to say it was not injurious, where ordinary cleanliness was observed; that it was a well known fact that those who used tobacco suffered less with their teeth than those who did not use it, that it was antiseptic in its nature I still think it is antiseptic, but I think I have proven by experiments during the past few weeks, that it is not antacid. My attention was called to it about a year ago while operating for a physician. He asked me what effect tobacco had on the teeth and I replied that it was antiseptic. He called my attention to the first right inferior molar and bicupids, each of which was decayed on the labial surface at the neck of the tooth. I told him it was caused by chemical action from acid formations. He asked why on these and on none of the other teeth, and told me that he felt sure it was caused by tobacco, as that was where he always carried it, and that he should discontinue the use of it. He was about 40 years old, had splendid teeth, took excellent care of them, and none of the others showed the least symptoms of decay. About six months ago a gentleman, sixty-three years old, came in to have his teeth cleaned. He had the full number of teeth, 32, all of them perfectly sound except first right inferior molar and bicuspids, which were decayed at the margin of the gums, the same as the other case mentioned. I called his attention to them and he at once said, "oh, that is where I used to carry my tobacco. I used it for forty years but have quit now."

Another case of a young man who had only chewed tobacco a year, and the molar and bicuspids were affected the same as the other cases mentioned. All three of these persons chewed what is called the "best fine cut."

I then began trying experiments, and resolved to call the attention of the society to it, that others might investigate, and also to give the result of my experiments. My plan has been to place a portion of the article to be tested in a small vial with pure water, cork it, let it remain over night and then test it for acid. It might be said that this is hardly as fair a test as it would have been to place it in saliva, but it must be remembered that saliva contains a small per centage of acid, and that in testing it you are far more apt to get an acid reaction than an alkaline, or even neutral. So that using pure water for the infusion, you probably get *less* acid reaction than if saliva were used. I have tried a great many different brands of cigars and in nearly every case there has been an acid reaction, some very marked and others only a trace; the cheap cigars showing far more acid than the higher priced ones. None of the cheap cigars but that showed acid distinctly, (when I say cheap cigars I mean 5 centers) while in many of the higher priced ones there was only a trace, and a very few, none at all. The moral of this is, do not buy poor cigars. Smoking tobacco I have not tested at all, as this does not come in contact with the teeth. Chewing tobacco gave by far the strongest acid reaction; being marked in every case, and the very best was as strong as the poorest. One sample of what was said to be the very best in market, after being placed over night in a vial with water, on touching the cork in the morning, it flew out with a pop, and effervesced like a bottle of beer. It turned litmus paper a bright scarlet at once. These, gentlemen, are the results of my experiments. I may add that I have smoked for 30 years and the upper tooth where I always hold my cigar, lost its vitality five or six years ago, but the lower one is perfectly sound. A friend, who is an inveterate smoker, has lost entirely by gradual crumbling, the upper tooth where he held his cigar, while the lower one is all right. I do not say that tobacco had anything to do with either of us in producing this result. What think ye?

ORAL ELECTRICITY AND "THE NEW DEPARTURE."

BY HENRY S. CHASE, M. D., D. D. S., ST. LOUIS, MO.

It was about six years ago that my experiments in Electro-Galvanism led me to write my papers on "Oral Electricity." Whatever of truth there was in those papers will live whether tenderly nursed, or fought against. It is not my purpose to do the former or oppose the latter. I only wish to put on record at this remote day my belief that every tooth filled with metal is a simple battery, ready to be set in operation on the addition of the proper stimulus.

I further wish to say that I *know*, from personal knowledge, that the "New Departure" PRACTICE has taken root and grown to great proportions in the United States. This is shown by the hundreds of letters from various dentists, from the extreme East to the extreme West, commending the movement, and encouraging the so-called "Apostles" in their aggressive work.

Such words as the following come from men acknowledged to be eminent in the profession, and at the same time have not in dental journals made the same public avowal of their thoughts:

"DEAR DOCTOR: * * * * I feel, as I know do hundreds of others, that I owe much to you and your *confreres* * * * for the work you have done in making more plain and practical the great business of *saving teeth*; and although it is still the fashion to deride 'The New Departure' doctrines in the dental meetings, yet I know of none who have not been influenced by them, and I believe there are not many who do not apply them at this day in practice."

The following extract is taken from a late journal, being the words of another no less eminent dentist:

* * * "When I look back at my commencement, and reflect that my early practice was founded upon what the older men in authority had published and taught, I shudder at the many teeth I extracted that I know might have been saved, even with the amalgam of that day. And I tremble at the advice *now* given by the authorities that GOLD only should be used as a permanent filling. Young men know no better, but older ones do. God forgive them, for I cannot."

In my own practice gold has been used less, year by year, until *now* I seldom put in a gold filling. The various plastic fillings have taken its place, together with Bonwill's crowns and White's porcelain "cavity stoppers." I have ceased to disfigure the the mouth by placing large metalic fillings in front teeth. Smaller cavities there are filled with zinc phosphate, white amalgam, and other non-conspicuous materials, while in bicuspids and molars, amalgams of various formulas are generally used.

The practice of Dentistry has become simple, easy, satisfactory to a degree which ten years ago seemed impossible.

My bills for *collection* are fewer in number because smaller; and being smaller are generally settled at the end of SERVICE in my office.

Fully one-half of all cavities that I now fill have been previously filled by various operators, good and bad, from once to four times, and more of them had been under the hands of *first-class* operators than otherwise.

Nearly all my patients are delighted with "The New Departure." A few have been frightened by ignorant friends and so have gone to some dentist who "never uses anything but gold," and had their worst fears confirmed by the saying, "that miserable stuff is destroying your teeth, and will ruin your health unless you have it immediately removed and the cavities filled with pure gold."

"The New Departure" is now no baby, but a vigorous Evolution that will bless humanity more and more, and it is old enough, and strong enough to now take care of itself.

AMERICAN MEDICAL ASSOCIATION.

SECTION ON ORAL AND DENTAL SURGERY.

Dr. D. H. Goodwillie, of New York, Chairman.

Dr. Truman G. Brophy, of Chicago, Secretary.

TUESDAY, JUNE 6TH—FIRST DAY.

The Chair appointed Drs. Allport, Brophy, and Williams, sub-committee, to which all papers read before the section should be referred.

Dr. William D. Kempton, of Cincinnati, presented a paper on

ORAL HYGIENE,

of which the following is a synopsis:

From the beginning the sole aim of practitioners was to discover a cure for disease and, although sometimes harmful, the medication received the credit. Now, one of the main objects of practitioners is to prevent disease. The profession is indebted to specialists for many, if not most, of these discoveries, as they are more apt to arrive at definite results than those whose attention is occupied with the whole field of medicine.

Oral hygiene was very important, and the evils arising from the neglect of it were far reaching. Good, healthy, even strong teeth were beautiful as well as serviceable, and indicated care. But when we find one whose teeth resemble the charred trunks of stately trees after the fiery scourge has visited the forest, and whose breath is suggestive of a cess-pool, we ask, whence comes this sad havoc?

Dr. Kempton then entered into a careful analysis of the teeth, giving their elements and functions, and the acid theory of decay by Dr. George Watt, with the factor that modifies the action of acids, viz., vitality. Then followed a list of the evils resulting from diseased teeth, showing that the whole system was more or less affected and deranged; many of the cases of headache, earache, affections of the eye, and stomach being traceable oftentimes to badly decayed teeth.

The doctor closed his paper with directions for preventing decay in teeth, prefacing with the remark that those teeth in which decay had already set in should be either extracted or filled. Physicians should feel it their duty to point out to their patients the results of neglect of the teeth, and no medical school should consider its curriculum complete unless some attention is paid to the teeth.

PHOSPHATES IN FOOD.

The paper was discussed at length by Drs. Williams, Talbot, Allport, Lawrence, Marshall, Goodwillie, Ellmer, Reed, and others, during which the subject of phosphates in food was introduced. The enamel of the teeth is composed mainly of phosphate of lime, and Dr. Allport was very earnest when he made the remark that our food should be taken as nearly as possible in the condition in which God prepared it. He referred especially to wheat, asserting that the so-called patent process of making flour eradicated much of the phosphate in the wheat, the result being that not enough of this was left to keep the teeth strong and healthy. He did not advocate the use of phosphates alone, but he did protest against food which had not enough of them to keep the system and teeth in perfect order.

Dr. Lawrence antagonized the stress placed upon this subject, alleging that other elements were as necessary as phosphates.

The Section then adjourned to meet at 3 p. m. on Wednesday.

WEDNESDAY, JUNE 7TH—SECOND DAY.

HEREDITY IN DENTAL DEVELOPMENT.

Dr. W. C. Barrett, of Buffalo, briefly sketched a case which had come under his observation, and which he illustrated by plaster casts, showing the persistence of heredity in dental development.

Dr. J. S. Marshall, of Syracuse, N. Y., then read a paper on "The Need of Dental and Oral Surgeons in the Army and Navy." The following is a synopsis:

This subject has often been brought to the attention of the profession, but never formally till August, 1861, at the American Dental Convention in New Haven, where it was referred to a committee of five, who, after consultation with Surgeon-General Hammond, reported favorably to the appointment of dental and oral surgeons in the army and navy. In 1868 Senator Hamlim introduced a bill before Congress providing for the appointment of such surgeons in the army and navy, but this measure died before it was born. The second attempt was made during the Forty-second Congress by Representative Townsend, who merely advocated the appointment of such surgeons to the military and naval academies, but nothing came of this but the appointment of a dental surgeon at the naval academy at Anapolis with the rank of assistant surgeon. Dr. Marshall then stated the necessity existing for such appointments.

The government provides for the care of a soldier in all cases, except where his teeth are concerned. Soldiers on the frontier and sailors on a long cruise, have no opportunity of receiving dental services, no matter how much they may need such attention, and the disease must run its course, being turned over to the bungling of the hospital steward or some less competent person. The treatment of fractures or gunshot injuries of the lower jaw, is the same as twenty-five or thirty years ago, being much behind the times. The interdental splint, invented by Dr. J. B. Bean, of Georgia, during the civil war, and improved by Dr. Norman W. Kingsley, of New York, is a very great improvement in the treatment of these cases, and is indorsed by the best surgeons the world over. The success with this splint has been remarkable.

The objection to the appointment of dental and oral surgeons in the army and navy, is that the amount of oral diseases is so small as not to require specially educated surgeons to treat them. Dr. Marshall then gave some statistics showing the relative number of men in the army and navy who, in the years 1878 and 1879, were reported as having needed dental services, also the opinions of the surgeons general of the army and navy, General Hancock and Amiral Porter, relative to the appointment of such surgeons. To petition Congress for action is useless, without the heads of medical departments see the need and make the recommendation. The paper closed with a recommendation that a committee be appointed by this Section to arrange a blank statistical report covering all the dental and oral diseases, and request the surgeons general of the army and navy to incorporate them in the regular medical and surgical reports.

A lively discussion followed on the subject of the paper, which resulted in the offering of a resolution by Dr. Allport that a committee of three be appointed by the Section, who, in connection with Dr. Maynard, of Washington City, and the surgeons general of the army and navy, should make what efforts they deemed advisable regarding the appointment of dental and oral surgeons in the army and navy, and to report to the association next year. This motion was adopted, and Drs Allport, Marshall, and Williams were appointed such committee.

FOOD IN ITS RELATION TO THE DEVELOPMENT OF TISSUES.

Dr. Lawrence, of New York city, presented a resolution calling for the appointment of a committee to consider the subject of food, including mastication, insalivation, digestion, and assimilation, in its relation to the development of the different tissues and organs of the body.

Drs. Lawrence, Talbot, and Kempton, were appointed as the committee.

The Section then adjourned to meet Thursday at 3 p. m.

THURSDAY, JUNE 8TH—THIRD DAY.

Dr. Goodwillie called attention of the Section to cases of

NECROSIS FROM ARSENIC,

and illustrated them with wax models.

Case I. showed, by two models, necrosis of lower jaw from each ramus forward. The case, before and after, with a new deposit of bone without any deformity. Photograph of the patient also shown.

Case II.—Two models showing a case of poison by arsenic and necrosis of right superior maxillary.

a. Showing case one week after removal of necrosed bone; without, in the least, disturbing the soft tissue; also showing the formation of new bone.

b. The new bone complete and the mouth perfect; and no external deformity.

Case III—Upper maxillary showing abscesses formed at nearly all the teeth, the result of applying arsenic to destroy sensibility of the dentine before filling the teeth.

The above served to show the sad results of the improper use of this powerful agent in devitalizing dental pulps.

Dr. Eugene S. Talbot, of Chicago, then read a paper on

THE INJURIOUS EFFECTS OF MERCURY AS USED IN DENTISTRY.

The paper was confined to the use of amalgam fillings in natural teeth.

"There can no longer be any doubt that amalgam fillings in teeth will sooner or later produce mercurial poisoning. The dire effects of this metal are not always seen immediately after the fillings are inserted, years sometimes elapsing before the injurious effects are felt and noticed."

The history of two well-marked cases were given by Dr. Talbot, the persons affected having called upon him for treatment. The amalgam fillings were removed, and gutta percha temporarily substituted, these in turn being replaced with gold, after which all symptoms of mercurial poisoning disappeared. A detailed account of a series of experiments made by him were then presented, the conclusions and results being as follows:

First.—Mercurial vapor is given off from amalgam fillings at all ages and from all varieties, even from fillings sixteen years old, the vaporization being sufficient in quantity to respond to chemical tests.

Second.—Minute doses of mercury, if taken internally three times a day, are capable or producing decided effects.

Third.—Mercury when inhaled into the lungs is far more active than when taken into the stomach.

Fourth.—If small doses taken into the stomach occasionally are capable of producing marked effects, and the vapor is much more active than the solid preparations of the metal, is it not a necessary consequence that amalgam fillings, which are constantly giving off mercurial fumes to be inhaled into lungs, not a few times daily, but always, without cessation, day or night, do, in many sensitive persons, produce deleterious effects?

Fifth.—When tons of this material are consumed annually, is it not credible that many constitutions are affected?

Sixth.—Physicians in treating dyspeptics, anæmics, and persons suffering from nervous debility, would do well to examine the mouths of patients and know if artificial teeth on red rubber or fillings of natural teeth have in their composition mercury or any of its compounds

EDUCATION OF DENTISTS.

The subject, How Dentists should be educated, was presented by Dr. W. W. Allport, of Chicago, in a paper of considerable length. The introduction was a review of dental surgery—it, with all other branches of medicine, having emanated from a common center, and the possibility was that in the future these diverse systems would more and more tend to consolidation.

Dr. Allport then said that the dental and oral surgeon must be educated both in mechanical dentistry and oral surgery, for no disease can be intelligently treated without a knowledge of the histology, anatomy, and the physiology of the organ or organs diseased, as well as the pathology, prognosis and rationale of the treatment employed to restore the parts to a healthy condition; and this is medical science. The successful oral surgeon must have a thorough medical education in all its branches, supplemented by special instruction in dental surgery. Over forty years ago Drs. Harris, Hayden, and others, sought to establish a department for teaching dental and oral surgery in the medical department of the University of Maryland; but their application was refused. Dr. Harris, however, succeeded in organizing what was known as the Baltimore College of Dental Surgery, and the graduates of this institution were given the degree of D. D. S.—doctor of dental surgery. In addition to this several medical colleges have been induced to establish dental schools in connecrion with their medical departments, but as yet none of these institutions have required a full medical education of their dental graduates.

All dental and oral surgeons should receive a medical education and become legitimate specialists in its practice, and all medical graduates should be as fully educated in diseases of the teeth and the science of their treatment as they are in other diseases.

Dr. J. B. Lawrence, of New York, then read a paper on Medico-Dental Science, after which the Section adjourned.—*Medical Record.*

CONDUCTORIAL.

STILL AT IT.

In imitation of cotemporary institutions into whose company it seems to be striving, but in vain, to enter, the bogus dental college of Morrison & Co., at Delevan, Wis., has issued an "announcement"—its "third annual." It contains, together with other things common to such publications, a list of its graduates, which, however, we believe to be incomplete, from the fact that it does not include the name of the party who was made by the law committee of the Dental Society of this State to leave for parts unknown. We give the list as published, noting the fact that one of the recipients of this concern's "degree" is a member of the faculty—a case of "self-conferred," which is bad enough in a reputable institution, but infinitely worse where sheepskins are going "dog cheap" at twelve dollars.

GRADUATES.

1881.—J. L. Benson, Manitoba; A. K. Harroun, J. A. Hatch, Wm. Hollinger, D. W. Kuhns, D. O. McKinley, Herman A. Orth, Pennsylvania; E. C. Ridgell, North Carolina.

1882.—Geo. F. Avery, Canada; Henry C. Ames, H. M. Oviatt, Wisconsin; James A. Alston, Virginia; Jacob S. Barth, Iowa; A. Bonifield, Ohio; Septa C. Clarence, Minnesota; John and E. S. McBurney, S. M. McNary, Irwin G. Stewart, Pennsylvania; Wm. R. Sutherland, Illinois.

The name omitted from this list, and referred to above, is that of John J. Kesler of this State, whose matriculation tickets bore the same date as his diploma. How many more of the same kind there are scattered through the country the "faculty" only knows.

◆

COLLEGE CHANGES.

By this time most of our readers have learned through other journals that Dr. F. J. S. Gorgas, after a connection with the Baltimore College of Dental Surgery of over twenty-five years, as professor and dean, has resigned in order to accept a similar position in the new dental department of the University of Maryland, one of the oldest medical colleges in this country. Prof. J. H. Harris, who for eleven years has filled the chair of clinical dentistry in the same institution, goes with Prof. Gorgas, and will lecture in the new department on operative and clinical dentistry.

In the Baltimore College of Dental Surgery the vacancies have been filled as follows: Prof. R. B. Winder has been elected dean, to succeed Prof. Gorgas; Dr. M. Whilldin Foster to the chair of pathology and therapeutics, and Dr. Jas. E. Lindsay to the chair of chemistry.

◆

ANOTHER ONE—DR. R. H. HOFHEINZ.

In January we noted the departure for England of Dr. W. C. Royce, and now we perform a similar office in the interest of Dr. R. H. Hofheinz, also a member in good standing of the Seventh District Dental Society and the Rochester Dental Club. The doctor goes abroad to visit or to become a fixture, as circumstances may determine. If this going out from our ranks continues at this rate, the secretary of the Seventh society will soon find it desirable to call our annual meetings for some point in Europe.

DENTAL MEETINGS.

NATIONAL.

The American Dental Association meets at Cincinnati, O., August 21st.

August 8th and Saratoga Springs, are the time and place of meeting of the American Dental Convention.

The National Dental Association of the United States of America meets at Washington, D. C., August 3d, 4th and 5th.

STATE.

The New Jersey State Dental Society meets at Long Branch July 19th.

The fourteenth annual meeting of the Pennsylvania State Dental Society will be held at Williamsport, Pa., July 25th, and following. The place is convenient to many who reside in this state.

OTHER.

The Southern Dental Association will meet at Baltimore, Md., August 8th.

The union meeting of the Seventh and Eighth District Dental Societies, will be held at Rochester, October 31st, and day following.

Dr. R. M. Fisher writes us that the Ontario Dental Society will meet at Toronto, Ont., July 18th. A good time is promised all who may attend.

STATE SOCIETY NOTES.

The M. D. S.'s now number eighty.

Drs. Brockway and Atkinson were re-elected,

Work on the transactions will begin as soon as the stenographer's notes arrive.

Members now regard Prof. Hailes, of the Albany Medical College, as " one of us."

Papers were read by Drs. Francis, Brown and French, and a lecture delivered by Prof. Abbott.

The committee of arrangements, Drs. Winne, Baxter and Hall, did its work well. President Straw had this in mind when making up his slate.

The degree of "M. D. S." was conferred upon the following: Wm. Wallace Walker, New York; Edward F. Hanks, Jersey City; Julien W. Russel, Brooklyn; Watson D. Woodward, New York.

The colossal colored drawing of a tooth, used by Prof. Abbott to illustrate his lecture on the minute anatomy of the dental tissues, was the work of Prof. Carl Heitzman. The time consumed in its production was thirteen hours.

Following are the officers and committees for the ensuing year:

President—L. S. Straw, Newburgh.
Vice-President—Frank French, Rochester.
Treasurer—A. H. Brockway, Brooklyn.
Secretary—J. Edw. Line, Rochester.
Correspondent—W. H. Atkinson, New York.
Arrangements—W. F. Winne, Albany; E. C. Baxter, Albany; H. A. Hall, Troy.
Publication—J. Edw. Line, F. French, Rochester; C. Barnes, Syracuse.
Ethics—Wm. Carr, New York; F. W. Du Bois, Poughkeepsie; C. K. Van Vleck, Hudson.
Business—H. G. Mirick, A. N. Chapman, M. E. Elmendorf, Brooklyn.
By-Laws—J. J. Pitts, C. W. Harreys, Brooklyn; J. H. Holley, Warwick.
Prize Essays—J. G. Ambler, W. H. Allen, Frank Abbott, New York.
Dental Law—H. P. Southwick, W. C. Barrett, Buffalo; F. French, Rochester.
Dental Practice—S. G. Perry, C. E. Francis, W. A. Bronson, New York.
Transactions—O. E. Hill, C. A. Marvin, Wm. Jarvie, Jr., Brooklyn.

◆

REMOVING LABELS.

A novel mode of removing labels from old bottles was suggested by Mr. Chase, at a meeting of the Alumni Association of Massachusetts College of Pharmacy. The face of the label is wet with water, and held for an instant over any convenient flame. The steam or heated water at once penetrates the label, and renders its removal very easy.—*Canadian Pharmaceutical Journal.*

IN MEMORIAM.

REPORT OF COMMITTEE ON THE DEATH OF DR. JOHN C. AUSTIN.

Mr. President:—It is with feelings of deep regret that we announce the decease of our esteemed friend and professional brother, Dr. John C. Austin, who after a weary struggle with that insidious disease consumption, departed this life at his home in Albany, on the 23d of Oct., 1871. Dr. Austin was born at Fenton, Staffordshire, England, on the 22d of Sept., 1817. In 1829, when twelve years of age, he came to America with his parents who located at Jersey City.

He studied dentistry in New York City with Dr. Alcott, and began the practice of his chosen profession in Jersey City, where he remained three years.

In 1842 he located at Albany, where he was actively engaged in an extensive practice for a period of forty years. He was one of the original members of the 3d District Dental Society, of which he was an ex-president. He was also an original member of this, the State Dental Society, and was honored by its board of Censors with the degree of M. D. S., on the 30th of June, 1870.

Whereas:—It has pleased an all wise Creator to call from earth, our esteemed friend and brother, Dr. John C. Austin; therefore

Resolved:—That by his death his family are bereft of a kind, generour and loving husband and father; the profession of an active, conscientious and worthy member; and the city of Albany, of an upright, Christian gentleman: One whose genial manner and generous nature endeared him to all with whom he came in contact, and whose memory will ever be held in grateful remembrance.

Resolved:—That while fully aware that words are inadequate upon the occasion of such bereavements, yet we tender to the family our true and heartfelt sympathy and condolence in this, their affliction, and rejoice with them that he died with the Christian's hope of a glorious immortality.

Resolved:—That this society place on record these expressions of its sympathy and sorrow, and that its Secretary transmit a copy of these resolutions to the family of the deceased, and to the *Dental Journals* for publication.

Committee, { Wm. F. Winne,
Edwin C. Baxter,
S. D. French, D. D. S.

CORRESPONDENCE.

THE ARCHER CHAIR OF EARLY DATE.

Auburn, N. Y., June 17, 1882.

Conductor Odonto. Journal. Dear Sir:

Yours of date received. You ask me to give you an outline of the history of the Archer chair—the so-called Archer chair of early date. This chair was originated by me about 1852–3. I had one constructed and placed in my office in Auburn about the year '54. The work was done by a man of the name of Justus Ask (of "Ask's patent" fame), then residing at Union Springs, N. Y. He was a cabinet maker and dealer in cabinet ware, also a preacher of the Baptist denomination.

The chair met all of my anticipations and grew in favor with all who were privileged to look upon it. About this time a company for the vending of dental goods was organized in the city of New York. This company opened a ware-room in Broadway, conducting the business in the name of trustees, one of them being one Miles, formerly of Ithaca. Miles soon learned of the existence of my chair and came from New York to Auburn, saw and purchased the chair, took it back with him to New York and placed it on exhibition at the ware-room already mentioned. It soon found a ready sale and created a demand for more, the result of which was a contract between Mr. Ask and the New York company, to furnish their establishment with chairs for five years.

On learning of the existence of this contract, I refused to permit Mr. Ask to fulfil his part of it except on these conditions: First, that he have the chair patented in my name, and second, that he make and place in my office a new chair as a substitute for the one I had parted with, all of which he agreed to do. He did make me a chair as agreed, but betrayed me in the patent. This is the story in brief of the so-called Archer chair of early date. More forthcoming if necessary.

Yours, etc.,

Geo. W. Tripp.

BOOKS, PAMPHLETS, PERIODICALS.

A Manual of Histology and Histological Methods. Edited and prepared by T. H. Satterthwaite, M. D., President of the New York Pathological Society, Pathologist to the St. Luke's and Presbyterian Hospitals, etc. With 198 illustrations. New York: William Wood & Co. Rochester: Steele & Avery. Pp. 478.

This book is designed to fill the gap between "the little hand-books of Rutherford and Schæfer" and the more imposing and expensive works of Klein & Smith, Stricker, or Frey, no one of which, according to the editor of the work in question, is thoroughly adapted to the wants of both physician and student.

Dr. Satterthwaite contributes the whole of part I, or nine chapters; while parts II and III, or nineteen chapters, are supplied by his fifteen associates, all of whom may be regarded as experts in the matters of which they treat. The first and second chapters are devoted to the consideration of materials and methods thought necessary to histological research, and will interest every one who reads them, no matter what his particular line of study may be; but chapter VIII will be more likely to attract the attention of the worker in the field of dental histology. Here are found six pages devoted to the structure, growth and development of the teeth, by far too few for more than a mere outline, which we presume is about all the author intended. Waldeyer is quoted at length, and his views endorsed as "the most complete and satisfactory extant." The illustrations, five in number, are also from Waldeyer, and are as familiar to dental readers as text-book cuts from dealers' catalogues. From the list of authorities at the end of the chapter we miss the names of Salter (mentioned, however, in the text), Magitot and Legros, and the late Dr. M. S. Dean. The book, as a whole, has been well-spoken of by qualified reviewers, and will be received generally as a valuable contribution in histological literature.

Manual of Dental Surgery and Pathology. By Alfred Coleman, L. R. C. P., F. R. C. S., L. D. S., etc. Thoroughly revised and adapted to the use of American students and practitioners, by T. C. Stellwagen, M. A., M. D., D. D. S., etc. With 314 illustrations. Philadelphia: Henry C. Lea's Son & Co. Pp. 408.

This latest addition to dental literature comes in the form of a text-book from a gentleman of conceded worth and ability in English dentistry. His career as a practitioner, and his twenty-five years of hospital work, entitle him to speak with some show of authority, and this he does for the most part very satisfactorily. Many of the methods described are decidedly foreign, but the otherwise possible effect of these are more than neutralized by the editor's notes, which are valuable and numerous, but which, according to our notion, would look better at the bottom of the pages (as Hitchcock's notes to Wedl's *Pathology of the Teeth*) than they do bracketed in the text. We have no doubt, too, that Mr. Coleman would then be better pleased with this effort to Americanize his work.

The chapters on irregularities of the temporary and permanent teeth, and the treatment of the same, are very full, and would of themselves make a good monogram on the subject. Coffin's expansion plate, described at length at the International Medical Congress, and since a matter of dispute as to priority of invention, together with other appliances more familiar to Americans, are fully illustrated and described.

The chapter on dental caries deals with the various theories that have been advanced from time to time to account for the causes, progress and other phenomena of decay of the teeth, and which, supplemented by the "septic" theory as formulated by Underwood and Milles, forms the most concise review of the subject we have yet seen. The remainder of the book is of a more practical character—treatment of dental caries, fitting artificial crowns, extracting, administration of anæsthetics, re- and trans-plantation, medicinal and surgical treatment of pathological conditions and growths.

The make-up of the book is first-class—the typography, paper, presswork and binding, being just what one would expect from the old and well-known publishing house of Henry C. Lea's Son & Co. "No dentist's library is complete without it," though stereotyped, is nevertheless true.

A Condensed Price-List of Dental Instruments. Illustrations. Philadelphia: Blake & Co. Pp. 10.

Announcement of the Dental Department of the University of California, for Session of '82. Pp. 24.

Impressions: Their Importance and Detail Considered. New York: Reese & Atkinson. Pp. 11.

Charge to the graduating class of Medical and Dental Departments of the University of Tennessee. By T. O. Summers, A. M., M. D., etc. Pp. 11.

Thirtieth Annual Commencement of the Philadelphia Dental College, Seventeenth of the New York College of Dentistry, and First of the Dental Department of the University of Maryland.

The Pacific Dental Directory: A Complete Register of all Dentists in California, Nevada, Oregon, etc. Compiled by W. O. Thrailkill, D. D. S. Oakland, California: W. O. Thrailkill. Pp. 20.

Trichinæ: How to Detect Them; and How to Avoid Them. By John Phin, Editor of *American Journal of Microscopy*. Illustrated. Rochester: Buusch & Lomb Optical Co. Pp. 20.

We have also received the following: Missouri Dental Journal, Medical Record, Dental Cosmos, Medical Brief, Ohio State Journal of Dental Science, Medical Bulletin, New England Journal of Dentistry, College and Clinical Record, Dental Register, Mechanical News, Dental Office and Laboratory, Stoddart's Review, Southern Dental Journal, Zahntechnische Reform, and The American, the proprietorship of which and Stoddart's Review has been merged in the "The American Co., Limited."

THE
ODONTOGRAPHIC JOURNAL.

VOLUME III.—*October*, 1882.– 3.

BONE-TISSUE.*

BY C. HEITZMAN, M. D., NEW YORK.

METHODS.

It is one of the strangest facts in histology that, although for a number of years dry specimens of tissue have been acknowledged to be worthless for microscopical research, bone even in our day is studied in the dry condition. All books of all nations on histology give accurate directions for slicing dry bone and grinding the sections thin for mounting in Canada-balsam. Such specimens are of little value for examinations with the microscope. Specimens of dry bone are about as useful for obtaining histological facts as are the silver-stained specimens of other tissues—*i. e.*, both exhibit the frame of the tissue, while all the soft parts, the real seats of life, are destroyed.

There is but one way to render bone-tissue suitable for study, and that is by softening fresh bone in a one-half per cent. solution of chromic acid, to which from time to time very small quantities of dilute hydrochloric acid may be added. If the chromic acid solution be changed every fourth or fifth day, and if a large quantity of the liquid be used for small pieces of bone, in a few weeks the specimens can be easily cut with the razor. This method was introduced by H. Müller in 1858.

---

* From proof sheets of author's work, "Microscopical Morphology," just issued.

but has been far too much neglected. The best specimens are obtained from portions in which the basis-substance is not entirely decalcified, as in these the bone-corpuscles and their offshoots, as well as the corresponding cavities in the basis-substance, the lacunæ and canaliculi, are best preserved. For mounting, only dilute glycerine should be used.

A number of examiners have attempted to settle the question whether the lime-salts are deposited mechanically in the basis-substance, or whether there is a chemical union of the molecules of lime and glue. The question probably will never be satisfactorily answered. This much is certain, that by the extraction of the lime-salts by means of chromic acid, no material changes are produced in the glue-yielding basis-substance.

BONE-CORPUSCLES.

As early as in 1850, R. Virchow discovered the identity of the "bone-cells" with other "connective-tissue cells." Though he at first held the mistaken idea that the walls of the cavities were the bone-cells proper, however, he admitted later that the cavities, being hollow and filled with a liquid, hold the bone-cells. He was the first who recognized them to be the seats of life, and able to proliferate and produce medullary tissue.

As late as 1871, Ed. Lang, in Stricker's laboratory, recognized the bone-corpuscles to be living matter or protoplasm in the fresh condition, endowed with the property of amœboid change. In this view the bone-tissue, as well as every other variety of connective tissue, is built up by a calcified, glue-yielding basis-substance, containing scattered cavities and outlets of the cavities—the *lacunæ* and *canaliculi* of former histologists; the lacunæ are filled with living matter, the bone-cells or bone-corpuscles. Nothing positive was known at that time as to the contents of the canaliculi.

In 1872,* I undertook to study the bone-tissue, both in fresh and preserved specimens. In fresh sections, taken from the condyle of the femur of young rabbits, transferred to the slide, together with a drop of a one-half per cent. solution of table-salt, or, still better, of Muller's liquid, with an immersion lens No. 10 of Hartnack, I recognized the bone-corpuscles. They were round or oblong bodies of a grayish tint, lying in a shining basis-substance, which appeared traversed by numerous light canals. In the bodies, which were indistinctly spotted, I could often see a nucleus-like formation, with scalloped outlines. "The cell-body," I said, "is surrounded by a light, narrow zone, in which numerous conical offshoots are visible emanating from the cell-body, and exhibiting the same character as the cell-body." In many places I could trace these extremely delicate, branching offshoots for a considerable distance in the basis-substance, and saw them unite with the offshoots of neighboring corpuscles. When the offshoots could not be followed far away from the body, I found their continuations to be the light, branching canals in the basis-substance.

---

* "Studien am Knochen und Knorpel." *Wiener Mediz. Jahrbucher*, 1872.

The offshoots and their anastomoses I could see very plainly in specimens stained with chloride of gold, where the dark violet bone-corpuscles were seen sharply defined upon the pale violet basis. The offshoots were likewise distinctly visible in specimens of bone, decalcified by lactic acid. With this method the corpuscles seemed not to have shriveled, as the rim between them and the basis-substance was not broader than in fresh specimens.

In specimens preserved in chromic acid, the bone-corpuscles appeared somewhat shriveled. The basis-substance inclosing their cavity was traversed by numerous canals. Most of the offshoots of the corpuscle resembled conical thorns, which terminated in fine points toward the calibers of the canals, but only in a few of these could I discern a granular substance which possessed the characteristics of the corpuscle.

In normal bone, I was convinced that the bone-corpuscles had offshoots which partly projected in the canaliculi, partly inosculated with each other. A plain view of these offshoots, however, could be obtained only in bone, in which an inflammation had been artificially induced. One of the first noticeable changes in osteitis was the swelling of the corpuscle and the increased distinctness of its offshoots.

In 1872 I was not aware of the significance of the union of the bone-corpuscles, and it was not until a year later that I made use of the structure of bone tissue for pointing out new biological views. I have been led, by careful researches of osteitis, to the conviction that the basis-substance must be pervaded by a large amount of living matter in reticular arrangement, which after liquefaction of the basis-substance is freed and participates largely in the inflammatory new-formation.

Direct proofs of the presence of this extremely delicate reticulum I could not obtain, as all trials with silver and gold staining of bone proved to be failures.

The bone-corpuscles, as well as all other connective-tissue corpuscles, are formations of living matter, which in a juvenile condition are found to be compact, homogeneous, or vacuoled lumps, while in full development they are nucleated plastids. Their shape varies, to some extent, with that of the territories of basis-substance in which they exist. We find globular bone-corpuscles, which have assumed a star-shape by the appearance of numerous radiating offshoots, in the earliest formations of globular territories. We also meet with globular bone-corpuscles at peripheral portions of fully developed Haversian systems, owing to the presence of the first formed territories of this system, and again in the interstitial bone-tissue between the systems, in places where no lamellæ are formed. In striated or lamellated bone-tissue the corpuscles are oblong or spindle-shaped bodies, slightly bent in the direction of the striæ or lamellæ, interconnected by larger offshoots, emanating from both poles, and by numerous delicate offshoots, traversing the basis-substance in a rectangular direction. The latter offshoots arise at right angles from both the periphery of the corpuscles and their larger longitudinal branches. In the Haversian systems the bone-corpuscles are slightly flattened, and in longitudinal sections exhibit their broadest oblong surface whenever the razor strikes a peripheral portion of a Haversian system, while they have the appearance of narrow spindles, when the razor runs through the middle of a lamellated system. In transverse sections of the system the corpuscles exhibit irregular shapes, and again vary in their diameters according to the depth to which they are cut by the razor. A spindle will necessarily look broader if the section has been made transversely through the middle, and narrow if near the ends.

VARIETIES OF BONE-TISSUE.

There are two kinds of bone-tissue, which, in the fully developed subject, however, are always combined with each other, viz.: the cancellous, epiphyseal, or spongy bone-tissue, and the compact or cortical bone-tissue.

(*a*) *Cancellous*, *Epiphyseal*, *or Spongy Bone-tissue* is built up by trabeculæ, arranged as a frame work inclosing the medullary spaces. It is the only kind found in early stages of development of bone. In the fourth, fifth and sixth months of embryonal life of human beings, and in dogs, cats, and rabbits, at birth, no other bone-tissue but the cancellous is found. In the juvenile skeleton, this structure composes the epiphyseal ends and the central portions of the shaft-bones, and the central portions of flat and short bones. (See Fig. 86.)

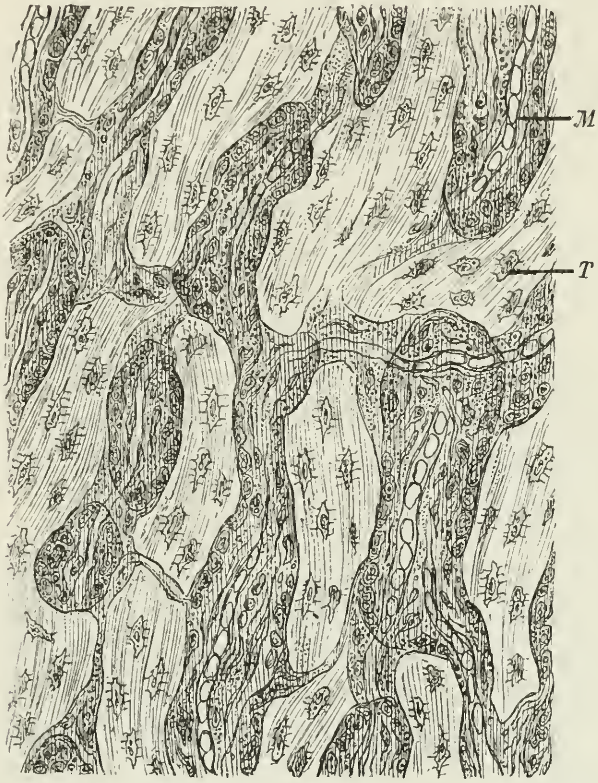


FIG. 86.—TIBIA OF A NEWLY BORN PUP, LONGITUDINAL SECTION, CHROMIC ACID SPECIMEN. [PHOTOGRAPHED IN 1873.]

T, trabeculæ of bone-tissue containing bone corpuscles; *M*, medullary spaces filled with medullary tissue, holding blood-vessels in the most central portions. Magnified 200 diameters.

Cancellous bone-tissue of the embryo is invariably striated and non-lamellated. In the fully developed skeleton it exhibits usually indistinct lamellæ. The spaces between the trabeculæ of cancellous bone are in youth filled with a richly vascularized medullary tissue, the "red medulla" of Virchow; while with advancing age the spaces exhibit fat-tissue, Virchow's "yellow medulla."

In very old persons there is an increasing deficiency of both the cancellous and compact bone-tissues; the bone corpuscles are also very small and few in number, as many of them have been transformed into basis-substance.

The relation between the cancellous and the compact structure differs in different bones. As a rule, the short bones are largely made up of cancellous tissue, with only a thin layer of compact bone at their peripheries. Flat bones exhibit the cancellous structure in the middle portion, the diploe of skull-bones, while the layers on the outer and inner surface are formed entirely of compact bone, the outer layer being generally broader and richer in blood-vessels than the inner. Thin, small, flat bones, such as the ethmoideal, turbinate, etc., may be considered as flattened trabeculæ of the cancellous variety. The shaft-bones have a broad investment of compact structure in their middle, *i. e.* diaphyseal portion, while this tissue gradually decreases toward the ends, the epiphyses. These parts, as well as the large central marrow space, exhibit the cancellous structure in greatly varying amounts. H. Meyer first drew attention to the fact that the trabeculæ of the cancellous structure, especially in the epiphyseal extremities of shaft-bones, were built up according to a certain law, and J. Wolff, with the assistance of Culmann, has explained, according to mathematical principles, the regular arrangement of the trabeculæ in the directions of lines of pressure and traction.

(*b*) *Cortical or Compact Bone-tissue* is composed of parallel lamellæ, closely packed together in intimate relation with the blood-vessels. The cortex of both flat and shaft bones consists of a concentric system of lamellæ surrounding the central marrow space, and this concentric system in its middle portion is traversed, usually at right angles, by a number of systems of lamellæ, each surrounding a central blood-vessel. Thus, too, peripheral systems of lamellæ originated, of which the outer is always the broader, and well marked, the inner often but little developed.

The middle portion, lying between the two peripheral systems, is traversed more or less rectangularly by the Haversian systems. In *transverse sections* of the cortex of shaft-bones, the lamellæ of the two peripheral systems run longitudinally, while the Haversian systems are cut transversely or obliquely. Between the latter there are the longitudinal lamellæ of the so called "interstitial or intermediate" bone tissue. (See Fig. 87.)

The Haversian system is composed of lamellæ which are disposed in concentric layers around capillary blood-vessels. Such systems of lamellæ are regularly arranged in the cortex of the long bones, and irregularly in the cortex of flat bones. The outer contour of a system is never smooth and even, but composed of a number of shallow protrusions, viz.: the first formed territories, and the aggregation of these formations gives the outer contour of a Haversian system a fluted appearance. The systems are sometimes found close to each other, with very little intermediate bone-tissue between them; or they may be more or less apart, with a distinctly lamellated intermediate bone-tissue

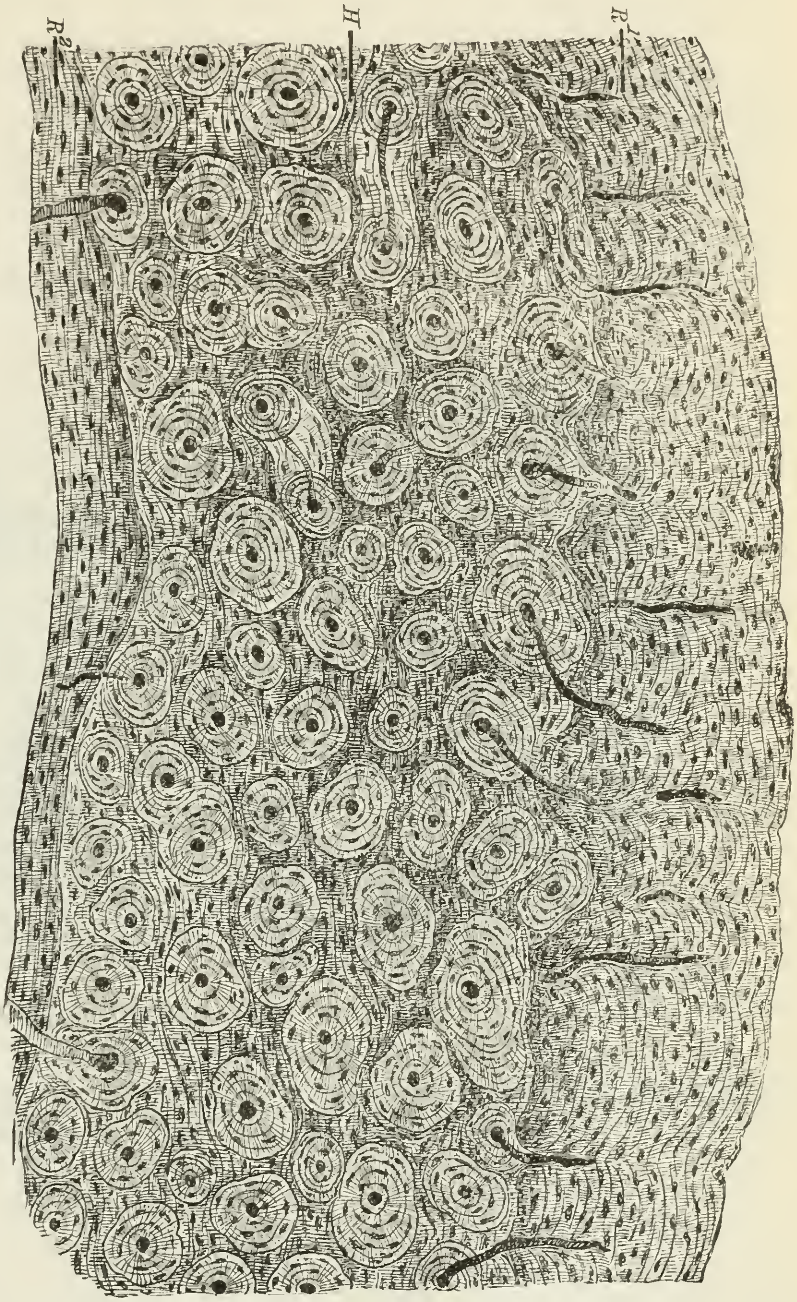


FIG. 87.—FEMUR OF A GROWN CAT. CORTICAL PORTION, TRANSVERSE SECTION. BLOOD-VESSELS INJECTED.

R^1, the outer peripheral system of lamellæ; *R^2*, the inner peripheral system of lamellæ; *H*, the intermediate system of lamellæ, traversed by so-called Haversian systems cut in transverse and oblique directions. Magnified 50 diameters.

between them, the lamellæ of which run in a direction more or less parallel with the peripheral lamellæ. This probably depends upon the original distribution of the blood-vessels, which, if ramifying at very acute angles, will make their systems of lamellæ lie close together; but if ramifying at less acute angles, will leave interstices filled with distinctly lamellated intermediate bone-tissue. In order to render the formation of cortical bone easily understood, the following illustration is often used: take a number of matches, around each of which is twined a cord, and wind the cord around the bundle, the match representing the Haversian canal, the twines around each match the systems

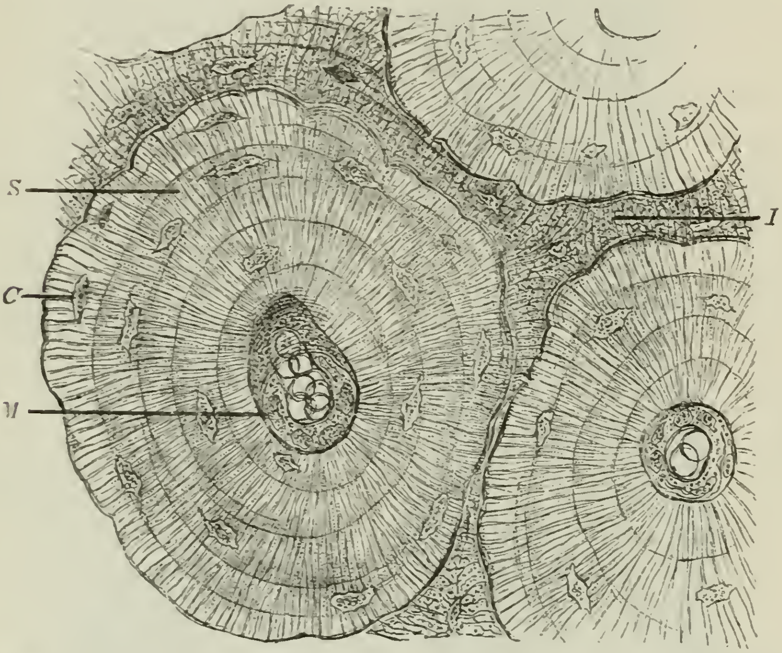


Fig. 88.—Tibia of a Grown Dog. Cortical Portion, Transverse Section. Chromic Acid Specimen.

S, Haversian system of lamellæ, containing the bone-corpuscles, *C*, with their radiating offshoots; *M*, central medullary, so-called Haversian canal, containing a capillary blood-vessel; *I*, interstitial bone-tissue indistinctly lamellated. Magnified 500 diameters.

of lamellæ, and the twines around the bundle the peripheral lamellæ. This comparison holds good, of course, only for the case in which the intermediate bone-tissue is absent. The law, however, according to which the peripheral and the Haversian systems of lamellæ are formed, has not yet been explained.

With higher amplifications of the microscope each Haversian system proves to be composed of a number of concentric lamellæ, which are not perfect throughout the system. Both within and between the lamellæ, bone-corpuscles are visible with radiating offshoots, a number of which traverse the lamellæ, without being in direct connection with a bone-corpuscle. (See Fig. 88.)

The center of the Haversian system is pierced by the medullary or vascular canal, which is of a varying caliber, according to the age of the individual, and contains, besides, a certain number of medullary corpuscles, and one or two central capillary blood-vessels. Whenever the extremity of the animal from which the shaft-bone was taken had been in a pendent position after death, the vessels are found filled with blood-corpuscles.

Longitudinal Sections are easily understood after the study of transverse sections. Here, too, the Haversian system is bordered by a fluting contour, due to the presence of globular territories of an early formation, and between the systems we find the intermediate bone-tissue, which in this situation, as a matter of course, will not exhibit lamination. In the intermediate portion we find the bone-corpuscles cut transversely, with most of their offshoots cut either obliquely or transversely, the latter being represented by a number of delicate dots.

In the Haversian system the lamellæ take a longitudinal course; within and between them are found the spindle-shaped bone-corpuscles, exhibiting, for reasons explained before, the greater bulk the nearer the periphery of the system. The offshoots of the bone-corpuscles emanating from their periphery, as well as from their polar projections, pierce the lamellæ at right angles. The central canal contains a varying number of medullary corpuscles, and in its middle one or two straight capillaries. Even with moderate powers of the microscope delicate filaments are recognizable, by which the off-shoots of the bone-corpuscles connect with the medullary corpuscles, and the latter with the endothelial wall of the blood-vessel. (See Fig. 89.)

PERIOSTEUM.

The investing fibrous connective-tissue layer of all bones, the periosteum as well as the cartilage, takes considerable part in the development of the osseous system. In human embryos of four to six months, the outermost layer of the periosteum consists of bundles of fibrous connective tissue, and between this layer and the cancellous bone there is a broad layer of medullary corpuscles, in continuity with the medullary formation in the spaces of the bone-tissue. From the outer fibrous portion of the periosteum oblique bundles of considerable density are seen to pass into the medullary spaces of the bone. and these bundles remain unchanged even after the compact portions of the bone have attained full development. Such bundles, faintly visible in chromic acid specimens, are termed "perforating or Sharpey fibers" (described by Sharpey in 1856. but previously by Troja, in 1814).

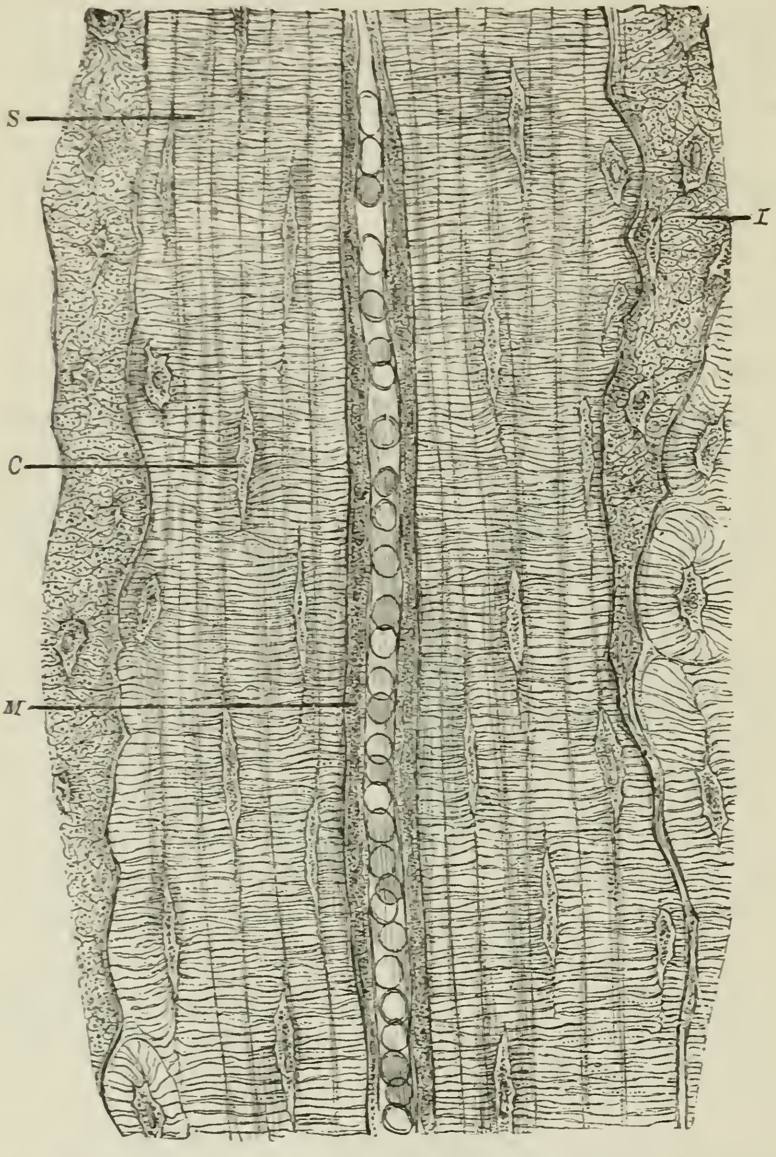


FIG. 89.—TIBIA OF A GROWN DOG. CORTICAL PORTION, LONGITUDINAL SECTION. CHROMIC ACID SPECIMEN.

S. Haversian system of lamellæ. containing the bone-corpuscles. *C*, with their transverse offshoots; *M.* central medullary. so-called Haversian canal. containing a capillary blood-vessel: *I.* instertitial bone-tissue. Magnified 500 diameters.

They traverse the outer peripheral system of lamellæ, sometimes in the form of single cords, sometimes as a broad reticulum, but often they are entirely absent.

In fully developed bone the periosteum consists of two layers, the outer fibrous portion being supplied with numerous blood-vessels, which inosculate directly with the blood-vessels of the bone-tissue, while the innermost portion, closely attached to the surface of the bone, is a dense ribboned layer, with a scanty supply of blood-vessels, but rich in elastic substance. This layer is often the seat of calcareous deposition, and owing to this fact its plastids assume an irregular, jagged contour similar to those of bone-corpuscles. The calcified periosteum, however, is not true lamellated bone. It is often described under the name of the "*osteoid layer.*" The periosteum is very thick at the points of the attachment of tendons and ligaments. The inner surface of the flat skull-bones, after the fifth or sixth year of life, is destitute of a periosteal investment proper. This can be clearly understood by the study of the development of these bones.

BLOOD-VESSELS.

The bone-tissue, its investment,—the periosteum,—and its contents, —the medulla,—are plentifully supplied with blood-vessels. They enter the periosteum mainly at the points of attachment of the large ligamentous formations mentioned above. Arteries and veins are most abundant in the outermost portion of the periosteum, where extensive ramification of these vessels takes place. The arterioles enter the larger canals at the surface of the bones and branch into capillaries, which unite to form the different veins accompanying the arterioles. At the inner surface of the compact bone, also, there is a free anastomosis with the capillaries of the medulla. The medulla is supplied with numerous capillaries, arising from the so-called nutrient arteries of the bone, which pierce the cortical substance obliquely and split at acute angles, both within the canal and after entering the medulla. The The veins collect the blood from tassel-like bundles of capillaries and accompany the afferent arteries. The epiphyseal portions of shaft-bones, besides the general medullary vessels, receive blood from the vessels which supply the articulations. The capillaries terminate, in the shape of loops, close below the articular cartilage. The veins in the bone-tissue are without valves, but as soon as they reach the surface of the bone, we find valves are present (C. Langer).

Lymphatics are not yet known to exist in the bone-tissue.

Nerves, both of the medullated and non-medullated variety, accompany the larger blood-vessels, but they are not abundant in the bone-tissue. In different places in the periosteum, Pacinian corpuscles are found.

The *medulla* of the bone is, in juvenile condition, a myxomatous tissue, at first of the medullary, later, of the reticular variety and, being freely vascularized, is termed "*red medulla*." With advancing age the medulla is almost entirely transformed into fat-tissue, while the blood-vessels decrease in number on account of the large proportion of fat; it is then termed the "*yellow medulla*."

◆

THE AMERICAN SOCIETY OF MICROSCOPISTS.

A REPORT MADE TO THE BUFFALO MICROSCOPICAL CLUB BY THE SECRETARY, W. C. BARRETT, M. D., D. D. S.

When the time came for the Executive Board of the American Society of Microscopists to select the place for the Fifth Annual Meeting, they fully realized the responsibility resting upon them. It would not do to make any mistake. The Society was young, and did not yet stand sufficiently firm upon its feet to safely take the risk of a failure, while there were influential and jaundiced microscopists who had predicted its early death, and who stood ready to assist in the fulfilment of their prophecies whenever they could, without risk to themselves, give it a sly and treacherous stab in the back. Elmira was finally settled upon, and the result verified the sagacity of the Board. The meeting was not alone a success; it was a triumph.

President Geo. E. Blackham, of Dunkirk, had been laboring all through the year, in season and out of season, with his microscope, his pen, and his voice, to arouse an enthusiasm, and Secretary D. S. Kellicott, with Treasurer Geo. E. Fell, of Buffalo, had not been idle. The Elmira microscopists early became imbued with the proper spirit, and started a boom which reached its culmination only upon the last day in the afternoon. Such princely hospitality has seldom been extended to any scientific body. Every visitor was entertained, and not this alone, but he was made to feel that he was at home, and among brethren.

The number in attendance was much the largest which has yet been secured for a meeting—about two hundred—and nearly every portion of our country was represented. There was a superabundance of papers, a large number being necessarily read by title only. Many of them were of a very high character, and the discussions at all times were animated and earnest.

The sessions were held in the Park church, which, with its suites of parlors, lecture rooms, halls and library rooms, proved most admirably adapted to the purpose.

The meeting opened on Tuesday P. M., August 15th, Dr. Gleason, of the Elmira Society, making a cordial speech of welcome, to which President Blackham responded. Then came reports of the Secretary, the Treasurer, and the standing and special committees. Time was given for the proper registration of members and the payment of dues, and so the Society got easily to work, and the members began to pull together. It is seldom that, at a meeting of this kind, so little time is spent in oiling the machinery and putting on chafing-gear—in tinkering at by-laws and appointing complimentary committees. The Society at once settled into steady work, it met promptly and was diligent until the close. There was an appearance of business, of earnestness of purpose, that was truly refreshing to one who has witnessed the fussy feebleness of those too often in charge of such meetings. This one was evidently managed by men of energy and ability.

Tuesday evening a large audience gathered in the auditorium of the church, to listen to the President's address. Thence until Friday, the Society held three sessions a day, and would have found plenty to do for another week.

On Thursday the annual election was held, which resulted in the choice of

Prof. Albert McCalla, of Fairfield, Iowa, for President.

E. H. Griffith, of Fairport, New York, for First Vice-President.

George C. Taylor of Thibodeaux, Louisiana, for Second Vice-President.

H. F. Atwood, of Rochester, N. Y.; Dr. L. M. Eastman, of Baltimore, Md.; Dr. F. S. Newcomer, of Indianapolis, Ind., for Executive Committee.

Secretary Kellicott and Treasurer Fell, hold over.

On Friday morning early, a special train was in readiness, provided by the untiring hosts of the Elmira Microscopical Society, and every member and visitor was invited to a day's excursioning. Watkins was first visited, where three hours were spent in rambling through its famous Glen. Dinner was provided at the Glen Mountain House, and after that was fairly disposed of, carriages, omnibusses, and other vehicles, transported the entire party to the wharf, when all went aboard the fine steamer, Onondaga, for a ride upon the lake. A band of music was provided, which played such inviting waltzes and quadrilles that it was not long before some of the gravest heads were bobbing up and down in an inspiring dance.

But Dr. Up DeGraff, of the Elmira Club, soon put a stop to this, and proceeded to propound certain sentiments, and, without preliminary warning, to call upon various members to respond. Dr. Blackham, the President, was first pulled out, and he was succeeded by Dr. W. C. Barrett. Then Prof. McCalla, the President elect, was forced to make a speech, and to him succeeded Prof. H. L. Smith, Dr. C. M. Vorce, Dr. Allen Y. Moore, Mr. E. H. Griffith, Mr. George C. Taylor and Dr. Dio Lewis.

The regular toasts being exhausted Dr. Barrett said he would like to assume charge of the meeting a moment, and he proposed, "The Elmira Microscopists; the princes of entertainment, the kings of hospitality;" and remarking that he desired to administer to Dr. Up DeGraff a dose of his own medicine, he called upon him for a response.

Long Point was finally reached, and here the party debarked and spent an hour or two, finally returning by the steamer and train to Elmira at night.

It is, of course, impossible in such a report as this, to attempt to sketch the discussions and debates. I can only present a few statistics. Some of the papers were of great value and interest, but I shall not try to make any estimate of their relative importance. There were in attendance at the meeting about one hundred and fifty actual members.

Sixty-eight new members were received, making the present membership over two hundred. There were many novel and useful implements, accessories and pieces of apparatus presented, and the exhibits of the dealers in optical instruments were very fine.

The following is a list of the papers presented:

1. On certain Crustaceous Parasites of fresh water fishes. Prof. D. S. Kellicott, Buffalo, N. Y.

2. The advantages of Osmic Acid as a staining and hardening medium. Dr. T. B. Redding, Newcastle, Ind.

3. Forms of life observed in the waters of Lake Erie. C. M. Vorce, Cleveland, Ohio.

4. A basis of natural classification of plants, by orders, genera, and species, found in the features of their seeds. Rev. J. T. Brownell, Mansfield, Penn.

5. Fresh water sponges. Henry Mills, Buffalo, N. Y.

6. Wheel like and other spicula of the Chirodata of Bermuda. Dr. F. M. Hamlin, Auburn, N. Y.

7. The epidermis of the Cyclostomata. Prof. A. H. Tuttle, Columbus, Ohio.

8. Polyzoa. Observations on species detected near Buffalo. Prof. D. S. Kellicott, Buffalo, N. Y.

9. Micro-Organisms found in the blood, in a case of tetanus. Dr. Lester Curtiss, Chicago, Ill.

10. Modifications of the Wenham half-button illuminator, with improved mounting. Dr. Robert Dayton, Cleveland, Ohio.

11. Memoirs of Chas. A. Spencer. Prof. H. L. Smith, Geneva, N. Y.

12. On the naked eye visibility of single ruled lines, not exceeding 100,000 to the inch. Prof. Wm. A. Rogers, Cambridge, Mass.

13. Micro-Photography, with the dry plate and lamp light, including lantern projection. W. H. Walmsley, Philadelphia, Penn.

14. A new species of Fluke, from the muskrat. Prof. A. H. Tuttle, Cleveland, Ohio.

15. Light and Illumination. Ernest Gundlach, Rochester, N. Y.

16. Effects of division of the Vagi upon the heart. Dr. A. M. Bleile, Columbus, Ohio.

17. The termination of the nerves in the liver. Dr. M. L. Holbrook, New York City.

18. Statutory Units of Measure. Prof. Wm. A. Rogers, Cambridge, Mass.

19. An improved method of illumination. Geo. C. Taylor, Thibodeaux, La.

20. A new freezing microtome. Dr. Thos. Taylor, Washington, D. C.

21. Observations on the fat cells and connective tissue corpuscles of Necturus. Simon H. Gage, Ithaca, N. Y.

22. Structure of the Maize Kernel. Dr. Geo. E. Fell, Buffalo, N. Y.

23. Description of the Griffith Club Microscope. E. H. Griffith, Fairport, N. Y.

24. Sporadic growth of certain diatoms, and the relation thereof to the contamination of water supply. J. D. Hyatt, Morrisania, N. Y.

25. Microscopical Organisms in the Buffalo Water supply. Henry Mills, Buffalo, N. Y.

26. Stereoscopic effects obtained by the Powell and Leland binocular arrangement. A. C. Mercer, Syracuse, N. Y.

27. The vegetable nature of the membrane in croup. Ephraim Cutter, New York City.

28. Methods of preparing and mounting sections the full size of the human brain, together with a microscope specially designed for their exhibition. Dr. Theodore Deecke, Utica, N. Y.

29. The International Micrometric standard. Dr. R. H. Ward, Troy, N. Y.

30. The Fasoldt Stage Micrometer. T. C. Mendenhall, Columbus, Ohio.

31. A new Camera Lucida attachment. Dr. Allen Y. Moore, Cleveland, Ohio.

32. Rhizolenia Gracilis, new species. Prof. H. L. Smith, Geneva, N. Y.

At the Microscopical Soiree on Thursday evening, for which 1,500 half-dollar tickets were sold to citizens of Elmira, about one hundred and fifty microscopes were exhibited. The variety of objects shown was surprising, and kept the attention of a large audience closely engaged until the hour for adjournment.

The selection of a place for the next meeting belongs to the Executive Board, but the claims of various cities and societies were fully discussed, and the committee was, by vote, requested to accept the invitation of the Illinois State, and the Chicago Microscopical Societies, to meet in the last named city in August, 1883.

◆

THINGS TO BE CONSIDERED IN REGULATING TEETH.

In regulating teeth, that is, in bringing them from an abnormal into a normal position in the arch, several things have to be taken into consideration. First, we must devise an appliance that will be effective; second, it must be constructed as simply as possible; third, it must do its work as quickly as possible, consistent with the existing circumstances; fourth, it should give as little pain as possible; and, lastly, it must be fixed in its position, and not liable to slip and cause injury and possibly defeat its object. Some of these considerations are too frequently overlooked by many who undertake this difficult class of work. There have been many systems, so-called, for the correction of irregularities, but no one of them contains all that is good or all that we need. The successful practitioner in this line is he who takes from each "system" that which will best serve his purpose, and then uses this with discretion. We sometimes see appliances for regulating, illustrated and recommended in our journals, that would require a master mechanic to construct and a skilled engineer to run. The idea also of moving teeth only on exact mathematical distance in each twenty-four hours, is a fallacy. What we want is to use appliances not too powerful, and then push our work along as rapidly as possible, having regard, of course, to the age and health of patient and the surrounding conditions. Much harm has been done in years past by the slipping of appliances and the consequent wounding or injury of the soft tissues. The pain that is usually attributed to the moving of the teeth too rapidly, I have satisfied myself, is due to the rubber band, or ligature, or plate, or appliance impinging upon the gum. To avoid this, I have for the past ten years adopted a plan of keeping all my fixtures from touching the soft parts. I simply make bands or rings of platinum plate, and slip one over the tooth to be moved and the other over the one that I want to use as my fixed point of resistance. To these have been previously soldered either pins, hooks, or bars, as the case may be. The bands are lined with phosphate of zinc and slipped over their respective teeth to a point about midway between the cutting-edge and neck. Being kept dry for five minutes to harden, they will afterward resist all the force we may apply to them without becoming loosened. Out of scores that I have applied in this way, none that were properly placed have ever become loosened, though force has been applied to them for months continuously. If we wish to use a jack-screw as our power, instead of a rubber band or bar, we need only solder stays or abutments to these bands at proper places and countersink them to receive the ends of the jack-screw. By their use we will have no slipping of fixtures, no impinging upon gum, and hence the very least amount of pain. In a couple of cases recently treated in this way, in each of which a central incisor was moved the width of its crown, and moved, too, as rapidly as double rubber rings would move it, occupying about a month's time in each instance, both patients have declared to me time and again, that they suffered absolutely no pain.—GUILFORD, *Dental Cosmos.*

◆

THE "GONOCOCCUS."

Neisser, in Breslau, who in 1879 published the discovery of a micrococcus which was to be found in every case of specific blenorrhœa either of unrethra or of eye, but nowhere else, has recently recorded his conviction that this "gonococcus," as he christens it, is the specific agent in producing the disease ; and quotes Aufrecht, Ehrlich, and Gaffkey, the opthalmologists Leber, Sattler, and Hirschberg, in support of his statements. But until recently the *experimentum crucis*—successful inoculation of the micrococci—had never been performed from the simple fact that animals are not susceptible to the gonorrhœal contagion, and human subjects have always preferred to acquire theirs in another way. Recently, however, Bokai, in Pesth, was so fortunate as to find six philanthropic students who placed their unrethras at the disposal of science. With the "gonococci" which Bokai had cultivated artificially from gonorrhœal discharge, the six were inoculated ; and three had the satisfaction of exhibiting a week later, a classical gonorrhœa. For one somewhat familiar with the natural history of medical students, the experiment would have been far more convincing if the dauntless three had been kept in solitary confinement for a week before and after the inoculation.—BELFIELD, *Chicago Medical Journal and Examiner.*

◆

FACIAL INDICATIONS.

If the experience of mankind is competent to interpret facial indications, some of the "propensities" and "perceptives" which Spurzheim lodges in the back rooms of his pan-sensorium must have a *penchant* for changing their quarters. "Firmness," for instance, which he locates in the posterior part of the upper head, undoubtedly manifests itself in the prominence of the *chin.* "Draw a face in profile," says Winckelmann, "and observe how timidity or its opposite, can be expressed by the shape of the lower jaw. Let the chin be receding, and your profile can be made to express pusillanimity and feebleness of character, even to the degree of imbecility. Then, without changing any upper line of the profile, combine it with a prominent chin, and it will exhibit firmness. Exaggerate the prominence, and you can intensify that expression to one of obstinacy and ferocity. That such contrasts are less striking in living faces is owing to the circumstance that we take in the expression of all features at a single glance, without analyizing the complex effect."

Have we not here a positive criterion, a rule without an exception? Does it not occur to us, on after-thought, that *all* warlike, aggressive nations have such projecting chins, while the weak or degenerate ones, are more or less chin-less? In their classification of the North American aborigines the Spaniards distinguish between *Indios mansos* and *Indios bravos* (tame and savage Indians). The former comprise the differeut agricultural tribes of Central and South America, ignorant but harmless creatures, who subsist on a vegetable diet; the latter the carniverous savages of the North, who divided their time between hunting and warfare. In their physical characteristics these various tribes of the American autochthones could hardly be distinguished, if it were not for a slight variation in the color of their skins and a very marked difference in the shape of their *chins.* Our redskins *have* chins, though they can not emulate those of the Indo-Germanic race; the Indians of Mexico and South America have none. In the profile of a vegeterian

Indio from the neighborhood of Vera Cruz, the lower jaw recedes in a sharp line from the mouth to the throat, so that his nose, though not excessive in size, becomes ridiculously prominent. Obstinacy with a projecting chin and shrinking timidity with a receding one, are here strongly contrasted, and the study of individual faces proves Winckelmann's rule to be almost, if not altogether, infallible.—ARNOLD, *Popular Science Monthly*.

◆

SELF-CONTROL.

There are few callings more exercising to human patience and *self-control* than the one to which dentists belong; and very few days pass in which they are not made painfully conscious of the need for thorough mastery over their temper and tongue. When patients come in declaring that all the fillings have come out; that they can do nothing at all with the set of teeth which has been constructed with the utmost care, and fitted in with conscientious exactitude; when some one more cheeky than usual vociferates in the waiting room, before several others, that the root of the tooth, the extraction of which was attempted the day before, had been left in; and when other of the thousand and one annoyances of general practice occur, they need to have themselves well in hand, to restrain the reply that rushes to the lips, to repress the frown that involuntary beclouds the features, and preserve in unruffled serenity, both their inward thought and outward demeanor. There is but one foundation upon which self-control can rest securely, and it has but two component parts; first, a knowledge of individual weakness; secondly, a conscientious discharge of every duty. If a man has a short temper, he should never forget the fact—if he has a gift for smart repartee, he should ever bridle his tongue.—ROGERS, *Missouri Dental Journal*.

◆

THE WISCONSIN DIPLOMAS IN GERMANY.

By the aid of the *Dental Cosmos*, which exposed, in the numbers for March, September, and October, 1881, respectively, the fraudulent character of the Wisconsin Dental College, I have been enabled, since my coming to Germany to practice, to render a service to all genuine dental colleges.

Germany has great respect for all titles, and it is considered very bad taste to omit them in addressing the titled individuals,—even going still farther, and extending them to the wives also. If a man is a Doctor or an Inspector, his wife is addressed as Frau Doctorin or Frau Inspectorin. The Germans have also great reverence for and obedience to law, as well as the customs of their fathers which have been handed down to them, and their conservative ideas are not readily abandoned.

The German laws regulate the rights of professional men in the nation, and the officials whose duty it is to protect those rights under the government, are jealously guarding all such rights, and looking after all spurious and fraudulent adventurers who seek to establish themselves in defiance of law. When such quacks are found they are quite sure to be suppressed. I suppose no person in possession of a diploma from one of our long-established dental colleges, would be deprived of the privileges of practicing in Germany, but when any individual endeavors to prey upon the reputation of American dentistry here, by claiming and possessing an "honorary" title from such a bogus concern as the Wisconsin Dental College, it is only necessary to visit the chief of the police department and state such facts as are susceptible of proof, when the offender, with his new signs of D. D. S. and his twelve-dollar-and-a-half "honorable" diploma, has to start for a new field. I had the pleasure to start one from the city of Hanover, as well as Bremen, who had established himself with new signs in these cities, qualified with such a handsome "honorary" diploma as the Delavan (Wisconsin) dental professors now issue for those who wish to buy for $12.50 (as I have been told). This bogus college did issue to one Edward Hauft, who knows little or nothing about dentistry, such a diploma, claiming to do so for a valuable discovery made by him in dental science.

It is quite gratifying that it is possible to put these fellows upon the tramp in Germany, and I wish we could be sure they could do no harm to American dental reputation in any other country. It is to be hoped that the State of Wisconsin will soon find a law to punish the contemptible fellows who are guilty of this grave offense. As for such professors, no matter what their skill or ability, they are engaged in a service which can only be criminal in the eyes of the law in any State or nation, and are much more to blame than the dupes whom they pro-ess to help by giving them such diplomas.—BISHOP, *Dental Cosmos.*

f

NO SALIVATION FROM AMALGAM FILLINGS.

I have practiced dentistry thirty-nine years. I never saw a case of salivation produced by amalgam fillings.

For the last eight years I have used amalgams constantly, amounting to 800 amalgam fillings per year, for the *average* of those eight years. I have mixed the amalgam in the palm of my left hand for more than nine-tenths of that time. I have never had any symptom of the pathological effects of mercury, either local or general. On the contrary, I have had better health than for ten years previous, and the color of my face has changed from paleness to a healthy, ruddy glow, and that, too, without the help of "beer, wines, or spirits."

All well read physiologists know that *experiments* have demonstrated that *very* small quantities of mercury increase the number of *red* blood corpuscles.—Chase, *Missouri Dental Journal.*

◆

EUCALYPTOL AND GUTTA-PERCHA IN ROOT CANALS.

It is my custom, after a pulp has been *thoroughly* devitalized, to carefully adjust the rubber dam and so prepare the crown that free and as direct access as possible be obtained to the pulp cavity and canals; then, by means of the usual nerve instruments, I carefully enlarge the canals and remove all that is possible of the devitalized pulp. Having accomplished this, I repeatedly wash out the canals with alcohol carried up by means of cotton on fine broaches, and pumped up also. Then, by means of fine needles of bibulous paper and the hot-air syringe, I thoroughly dry the cavity and canals. My next step is to force eucalyptus up in the same manner as the alcohol. If there has been no periodontitis, I at once proceed to introduce gutta-percha into the roots. This I accomplish by warming small bits of gutta-percha and, with the aid of a spatula, rolling them on a porcelain slab until they are reduced to fine wires, pointed at one end. These gutta-percha wires I dip, while warm, in eucalyptus, and immediately insert them into the canals, forcing them up to place with fine, smooth broaches. It will be found that enough gutta-percha will be dissolved to form a paste-like mass, which will be forced up into the minutest parts of the canal. This part of the operation should be gently performed, so as to avoid forcing beyond the apex. In cases where there has been previous trouble, I pack the roots with cotton and eucalyptus, and insert a trial filling, for a few days, of gutta-percha. After packing the canals, I generally dry out, and fill the remainder of the cavity with oxyphosphate cement until such time as I am prepared to insert the permanent filling in the crown. Always, after finishing the root fillings, I paint gums with iodine. It was formerly my custom to cleanse the roots slowly, at different sittings, but I think I have been more successful since I adopted the immediate and thorough method. My records show that in the past two years I have developed no after-inflammation, which was not easily arrested. Where constitutional treatment is required to arrest periodontitis, I obtain the best results from aconite and belladonna.—PARMELE, *New England Journal of Dentistry.*

◆

THE MOUNTING OF ARTIFICIAL CROWNS ON NATURAL ROOTS.

REMARKS BY DR. W. H. DORRANCE.

Within the last few years we have been enabled to place crowns upon roots with the roots fully protected against any further loss of substance, and against the action of the secretions of the mouth or other agencies which would tend to destroy them. I will glance over a few of these methods hastily. For instance, a root in very bad condition, very much wasted may many times be saved in a very simple manner, by the construction of a platinum band or ferule, and placing it upon the root, building up a crown thereon with amalgam. This method will save some roots that cannot support a crown with a pivot. We have, we will say, the root of a lower bicuspid, which is in a healthy condition, so far as the support of it is concerned. It is below the gum and may indeed be split through the weakness which has followed the loss of so much of its substance. Having filled the root with amalgam, a very simple and inexpensive way, I will explain the method of forming the ferule, which I consider the most expedient. There are a number of ways, but this is the simplest one. Dr. Taft, I believe, originated it, at least he suggested it to me. I first take a strip of platinum sufficiently long to enable me to more than surround the root and place it upon the root. Then with the pliers I draw the ends together, getting a tight fit around the root. I then solder the ends together, letting them lap slightly. In this way I get a ferule fitting the root. That can be used in what is called the Richmond crown. It is really a very simple method. Of course the roots should be in a healthy condition and thoroughly cleansed. Pains should always be taken to prepare the root, so that in case of accident you may be able to remove whatever supports you may have placed in position. The method of putting into a root a support or pivot in such a manner that it is impossible to remove it or very difficult to remove it, is not a good one. In attempting to drill out the material which you have put in you will find that if these barbed pivots, which cannot be readily withdrawn, have been used, the drill will be run out on one side or the other through the tooth, or into the structure of the tooth, for there is so much of the substance of the tooth gone that the resisting power of what is left is very slight.

REMARKS BY DR. W. C. BARRETT.

I will attempt briefly to give my method of putting on crowns, hoping that I may give you as clear an idea as possible. A patient comes to me, for instance, with a lateral incisor broken off, or I find it so far gone that it cannot be saved. The first thing I do, if the nerve canal is in an irritable condition, if there is any soreness about the tooth, or it has not been previously filled or treated, is to treat the nerve canal till it is in a healtey condition. Then I fill the apex of the root. Then I grind it down level with the gum, or a little below the gum. I grind it down a little in the center with a round burr. The roots of the tooth have been filled a quarter or a third of the way up. I do not attempt to make any notches or any screw thread, or anything of that kind in the interior of the root. I enlarge the nerve canal so I can put a pin into it of sufficient size to hold the pivot. The next thing I do is to take some gold 30 or 32 thick, using a strip half an inch wide and wrap it around the end of the root. If I find the shape of the tooth falls away any, I make it as level and as even as I can.

With my pliers I shape the gold as carefully as I can, fit it and burnish it till I get it down as close as I can. Then with a pair of nippers I wrap it around the tooth till one end strikes the other, mark it with an excavator at the point which I think is about right. It is only around the end of the root, but I mark it at the place which looks about right to me. If it goes on easily over the root, without spreading, it is a little too large, so I file away one of the ends a little and bring them together again. Finally I slip the gold over the end of the root till it spreads a little. I burnish it down till I get a good fit, bringing the ends together and soldering it. If I get it a little too tight I draw it out a little, making the edges of the lower side sharp. Now I try it on and see if it is all right. I put it over the end of the root, get my mallet and a piece of hickory wood and have them all ready. I do not say anything to the patient about this, because it is not an enjoyable part of the process to him. I put it in place, put my piece of hickory across it, and with the mallet I give two or three sharp blows, driving it up firmly until it is so fastened on the root that I am going to have a pull to get it off. Having got this in place, the next thing I do is to dress down the band until I have got it about the right length in the mouth. Then I go to work and put in the pin. I let it stick up a little. I use some material that will stand the heat. Platinum does very well, and gold is very good. I get a tooth of the right size and do the necessary grinding to give it the right shape. I grind it until it fits or until I have got it just as I want it. The tooth is then laid one side and I prepare my modeling compound and take an impression. My girl uses a syringe with cold water, and throws water all around the tooth, cooling and cleansing it. I have my modeling compound pretty soft. The girl throws the water on it until she has chilled it so it is stiff and hard.

Now I have a perfect impression of the tooth with the pin in place. The next thing to do is to get off the band, which is no easy task if I have it swedged on as closely as it ought to be. Having this band taken off from the root and having a sharp clear impression, it is an easy matter to fit on the tooth. A good deal depends upon getting a sharp, clear impression. I do not take any plaster cast, but use the modeling compound instead. Taking this impression in the modeling compound I have not only the shape of the pin sticking up from the root, but the model of the teeth on each side. I next go to work and dress the pin down with the level of the rest. I next put my tooth in place on the model. I stick it fast with some wax. I have a perfect mental picture of it. Here I have a lateral incisor and a model of the teeth on each side of it, one on each side and my impression of the root, with the edges of the band sticking up around it. So I can put my tooth in place where it belongs. I then flow in 18 carat gold till it is all solid. In my description I have left out one thing which has just come to my mind. It should have been done before. I refer to backing up of the tooth. I have some platinum rolled out as thin as I can get it, just like tissue paper. That is sufficient to back up the tooth with. I always back it up so the solder may flow on it. I am not particular whether it is a rubber tooth or not if I am satisfied it is a good one. Rubber teeth do not always stand the heat. I do not use the mouth blow-pipe. but use the Fletcher furnace blow-pipe. Putting my material on a piece of pumice stone, I heat the whole thing up until the solder flows nicely. keeping my blast going until the material runs easily. I use platinum sponge because it attracts the solder better. Platinum sponge is nothing more or less than platinum and gold. I have it so that zinc will run through it the same as water through a sponge, till it is a perfect solid mass. After it is cooled down I polish it up, and that is all there is to do, except to put it in place. I seldom try this on because don't consider it necessary. I am perfectly satisfied it will go in place. There is no difficulty about that. In this stage of the process which I have described—the soldering, it is necessary to use a pretty high heat. When this is all finished up I dress the tooth a little more to make room for the cement. I allow a vent from the cavity, which I fill with oxychloride cement. I then put the crown in place, take my piece of hickory wood, place it on the tooth, giving two or three sharp blows, driving it to place until it is solid.—*Transactions of Michigan Dental Society.*

◆

THE PRIMARY ACTION OF ETHER.

Probably every operator has noticed frequent cases where ether is being administered, of marked, early and transient, or what is termed the *primary action* of the drug. We do not remember to have read any extended account of operations being performed under this condition, and so jot down these few lines. We have made no extended experiments in this direction, though we believe the field a promising one, and trust that this article may be the means of leading some to enter it, or of bringing thoughts or suggestions from those who have already explored the same. Of course, only slight or minor operations can be performed under this condition, but it is possible many times to remove several teeth with but little if any consciousness. We have removed one or two teeth, without the least consciousness, in three minutes or less from the commencement of the inhalation to complete restoration to consciousness. The primary action usually results in from one to five minutes, and experience best teaches one when it is *just the right time to operate.*

We would suggest. first to get the patient perfectly quite from excitement and (if they are willing to take the risk of a litle pain, the prospect is all the more favorable) present the ether rapidly. Watch the pulse, respiration, and the whole appearance ; in fact, be *wide awake.* It is surprising how quickly the *appearance* of *complete* anesthesia will be produced. Have the patient held firmly and pay no more regard to manifestations of pain than you would under the action of nitrous oxide. If you are sure the patient really suffers, a few more inhalations will usually bring another period of unconsciousness, when the operation can be completed. In our experience there are cases when we much prefer this method to the use of gas, both as regards safety and also the comfort of the patient. For a difficult case in extracting several teeth, we would of course not advise this method ; neither would we in other cases where the indications are that the patient would be unmanageable, but simply in those cases where your judgment tells you it is the thing. Let members of the profession be heard from through our columns.—*New England Journal of Dentistry.*

MEDICAL ÆSTHETICS.

At the banquet given at the annual meeting of the State Medical Society of Arkansas, there were ingenious accompaniments to the feast. At each plate was a little white roll, in appearance suggesting a surgeon's bandage, and labeled " Epicurean bandage." Upon unrolling this it was found to consist of a yard of fine gros grain silk ribbon, upon the middle third of which was printed, in red letters. the bill of fare, in the form of a prescription, in Latin phraseology, the perusal of which afforded much amusement. At each plate also lay a model of a surgeon's saw in stiff card, upon which were printed the toasts, with the names of these who were to respond to them.—*Medical Record.*

CONDUCTORIAL.

The heavy leader wherewith to adorn this page is wanting. Too much vacation, and other things, constitute the reason. We have no doubt the reader will survive, perhaps with thanks.

The Fifth District Dental Society met at Oswego, Oct. 10th and 11th. If the programme was carried out as published, they must have had a good time.

The Seventh and Eighth Districts Dental Societies will hold their annual re-union at Rochester October 31st, and day following. Reports are expected from the chairmen of the several sections, and papers from six to eight individual members.

The old Merrimac Valley Dentist Association is no more. A recent meeting called for that and other purposes, transformed it into the New England Dental Society. Our omnipresent friend, Dr. W. C. Barrett, addressed the society on the subject of the "Physiology of Anæsthesia."

The following explains the sudden decrease in the size of the *Independent Practitioner*. The editor has a very happy way of letting delinquents down. Coals of fire?

An Apology.—These few pages are offered as an apology for our August number, with the following explanation. Both of our associates retired while we were taking our essential summer vacation. Our Dr. Geo. H. Rohé has embarked in his own little boat, the *Medical Chronicle*, of Baltimore, which is a new sprightly monthly for one dollar a year. We say Ro(w)he well and to grand success. Our Dr. Geo. W. Field has returned to London, where we wish him much prosperity. Adieu, dear associates, your labors have been appreciated, and your retiring from the editorial corps of the *Independent Practitioner* is regretted.

PELLETS.

Our July batch of "Pellets" was thrown out by the printer on account of the "crowded condition of our columns." By charging back to that time anything particularly stale in this, the reader will get on the right track again.

Did we hear some one say—"Näbolï?"

He wanted to look at some anti-monopoly teeth.

If you don't know what it is, call it *Yuba-cissi.*

Bucknill has diagnosed Dean Swift's disease as "labyrinthine vertigo."

The *Popular Science Monthly* for October contains a portrait of Virchow.

Even "that frog" got his share of attention at the American Dental Association meeting.

Dr. Geo. E. Hayes, of Buffalo, died worth $200,000, one half of which is to be devoted to scientific purposes.

The Eighth District Dental Society experienced a "Zephyr" at its late annual meeting. Killed and wounded not reported.

At the late Cincinnati meeting several attempts to "patronize" Dr. Atkinson ended in failure. The doctor wouldn't have it that way.

The American Dental Association devoted much time to the discussion of methods of correcting irregularities of the teeth. Many new points were brought out.

The New York Odontological Society has published a handsome card giving the names of resident, non-resident and honorary members, and of officers and committees.

The April number of the *Missouri Dental Journal* introduced a new feature, a "department of German and French dental literature." Dr. Louis Ottofy has it in charge.

The 28th of June last the following gentlemen received from Harvard the degree of "Doctor of Dental Medicine:" Dwight M. Clapp, George Eubank, Edward E. Hopkins.

The spring months are a bad time for dental meetings. Something in the air at that season of the year is too apt to put the average member on his mental muscle. October weather may favor a better state of mind.

"St. Jacob's Oil" appears to be a feeble and badly made aconite liniment, and it consists mainly of water, ether, alcohol, turpentines, and a small proportion of aconite with red coloring matter.—Squibb's *Ephemeris.*

Experiments on board the Labrador with "stored electricity," or what *The Sun* terms "electricity on tap," suggests the sale, in the near future, of heat, light, etc., like milk and other liquid indispensables—by the quart.

Contributions to the body of the ODONTOGRAPHIC JOURNAL, publications for notice, and exchanges, should be directed to 20 West Main Street. Business communications should go to the publishers.

The Colton water motor, exhibited at the late meeting of the Dental Society of the State of New York, is a very simple and apparently effective affair for running small machinery. It may be set in a sink, lavator, or hand-basin, and attached to a faucet by means of rubber tubing. Fitted for dental use the cost is twenty dollars.

Belfield, whose name is appended to "The Gonococcus" on another page, is the gentleman to whose lot it fell, a few years ago, to devour more or less of a trichinous rat, the last of a number used by himself and Atwood in their experiments to determine the proportion of hogs infested, etc. He survives his Oriental diet.

At the close of the annual meeting of the Seventh District Dental Society, at Auburn, in April last, a new member asked an old one in regard to the scene following the election:—"Does this thing happen every year?" The answer was—"Yes; but this isn't a circumstance. Wait till you see us perform at Rochester." The new member is waiting.

It may not be known to many that dentistry has a representative in the field of general literature, but such is the fact. "A Canadian Mecca," the beautifully illustrated article with which the May number of *The Century* opens, is the work of Dr. W. Geo. Beers, of Montreal, Ont., well-known to dental readers of a few years ago as editor of the *Canada Journal of Dental Science.*

"See the little pistol
In the little shop;
See the urchin buy one
With a joyous hop.
See him gaily load it
With a deal of care;
Then see his little head
Flying through the air."—*Puck.*

BOOKS, PAMPHLETS, PERIODICALS.

Microscopical Morphology of the Animal Body in Health and Disease. By C. Heitzman, M. D., late Lecturer on Morbid Anatomy at the University in Vienna, Austria. With 380 original engravings. New York: J. H. Vail & Co. Pp. 849.

This work, the latest and most elaborate of its kind, is the product of ten years of hard work on the part of its author, and may be regarded as his final, and unquestionably successful, effort to found in thiscountry a school of histologists whose starting point shall be the reticular, or granulo-reticular, structure of animal protoplasm, and possibly, as indicated by at least one of the contributions to the volume, of vegetable protoplasm too.

He is "aware that not all the facts and conclusions here laid down will meet the immediate approval of professional microscopists. . . . As many of the assertions made in 1872 and 1873 have already been found correct by good observers, I confidently expect that the others too will, in time, be accepted, although directly contrary to the cell-theory."

Of his work in this country he says: "In the autumn of 1874 I left Vienna, and, on the first of November of the same year, opened a laboratory for microscopical investigation in New York. This has proved successful beyond all expectation. Over seven hundred attendants, among them some of the most intellectual and independent members of the medical profession, have here satisfied themselves of the correctness of my assertions. A number of these have made valuable investigations in my laboratory, the results of which will be found embodied in various articles in this book." Among the number here referred to may be found Dr. C. F. W. Bödecker and Prof. Frank Abbott, who contribute articles on "Dentine, Cement and Enamel," "Dentine and Enamel of Deciduous Teeth," "Secondary Dentine," "The Pulp of the Tooth," "The Pericementum," and "Caries," all of which have appeared in the proceedings of societies as published in the *Dental Cosmos*. The author adds a few remarks on the subject to which the chapter is devoted, and hints at investigations now in progress in regard to the development of the teeth and the destruction of the teeth of the deciduous set.

The attention of the reader will be drawn from the very first to the illustrations, three hundred and eighty in number, and *without* *exception* ORIGINAL. This is the more remarkable in a modern scientific work, and particularly an American work, because, with few exceptions, authors, and compilers of the product of such, seem to think old illustrations good enough, or better than they themselves are able to produce; or possibly on account of authors' (or their publishers') penuriousness or impecuniosity. Nothing of the kind has been permitted by those interested in the production of this work to mar in any particular either its utility or its beauty; for beyond their usefulness in conveying to the reader accurate notions of the minute structure of the tissues, they have a value as finished works of art, alike creditable to artist, engraver, and printer.

The book is handsomely and substantially bound, and sells for seven dollars, a figure so low that its projectors are not likely to grow rich on even an extensive sale.

TRANSACTIONS OF THE NEW YORK ODONTOLOGICAL SOCIETY, 1880. Philadelphia: Trustees of Samnel S. White. Pp. 110.

A little old, but as readable as when the contents first appeared in the *Dental Cosmos.*

ANNOUNCEMENT OF THE ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO, 1882–3.

FILINGS.

Gamin for "green stain": "Billy, yer better go home an' comb the moss off yer teeth."

Scene—A butcher's stand. Butcher: "Come, John, be lively now, break the bones in Mr. Williams' chops, and put Mr. Smith's ribs in the basket." John: "All right, sir, just as soon as I've sawed off Mrs. Murphy's leg."

Marrowfat was telling his wife, at the breakfast table, the story of a friend who met with a thrilling adventure and escaped "by the skin of his teeth." The circumstance that anybody should have skin on his teeth struck Marrowfat, Jr., as so remarkable, that he glanced up, and, with the utmost innocence, asked: "Pa, was that before he was weaned?"

THE
ODONTOGRAPHIC JOURNAL.

VOLUME III.—*January*, 1883.—-4.

THE PHYSIOLOGY OF PROTOPLASMIC MOTION.

BY TH. W. ENGELMANN, M. D., OF UTRECHT.

Translated by Chas. S. Dolley, M. D., Rochester, N. Y.

I. INTRODUCTION.

Living protoplasm possesses in many cases, at least as it appears to the assisted eye, the power of independent rapid movement. The motion expresses itself in a change of form and internal arrangement of the protoplasmic mass, the volume of which apparently remains the same.

These changes may also be produced artificially, by means of the so-called stimulants, or irritants; and are governed by the common conditions of life. Herein they also agree with the movements of muscle fibres, and ciliary organs with which they are directly connected through abundant transition forms. They may, therefore, be included with both these forms of movement under the term, MANIFESTATIONS OF CONTRACTILITY.

The peculiarity of protoplasmic motion lies, in the first place, in that the particles of the contractile mass, do not, in general, move themselves about a firmly fixed layer, but are able to change their arrangement apparently as they choose, in a manner similar to the particles of a fluid. The impulse of the normal movement is not produced from without, but originates in the moving particles themselves.

Protoplasm possesses not only CONTRACTILITY and IRRITABILITY, but also AUTOMATISM.

It unites in itself these three qualities, which in ciliary organs are distributed over two (protoplasm and cilia) and in muscles, over three; (ganglia, nerve, muscle,) histologically different apparatus. It corresponds, therefore, to a low form of germinal matter.

In the protoplasm so widely distributed among the lowest living forms of both animal and vegetal organisms, and especially in the embryonal or young cells; the above qualities exist notwithstanding the lack of a connected anatomical formation (see below). We are unable to draw very sharp boundaries between protoplasmic motion and other forms of organic movement. The transition between PROTOPLASMIC and MUSCULAR movement is well illustrated in the body substance of many infusoria (1), the tentacles of *Acinetæ*, the superficial sarcode of the sponges (2), the embryonal muscle cells of the higher animals, and the endothelial cells of many, especially young capillaries (3), the contractile pigment cells which in the skin of crustaceans, fishes, amphibians, and reptiles (4), are under nerve influence must not be forgotten, and those PROTOPLASMIC changes in reference to the revolution (of the cilia) in CILIARY motion, observed, among others, by DE BARY in the spores of *Myxomycetes* (5), by HAECKEL in *Protomyxa* (6), in the ciliated epithelium of the chalk sponges, (7) and in the segmentation of *Syphonophora* (8), and by CLARK in the *Flagellata* (9).

The peculiar, so-called protoplasmic movements, are distinguished from those which occur in cells, and the changes which take place in

---

1. TH. W. ENGELMANN. Contraktilitat, Doppelbrechung. Arch. f. d, ges Physiol. XI. S. 448. 1875.
2. LIEBERKUHN Neb. Bewegungserscheln, d. Zellen, S. 346. Marburg, 1870.
3. Vgl. u. a. S. STRICKER, Untersuchungen ueber die contraktilitat der capillaren. Wiener Sitzgsber. d. math. naturw. CL. LXXIV. S. 313. 1877.
4. A digest of the somewhat extensive literature of this subject by G. SEIDLITZ, Beitrage zur Decendenstheorie S. 31-36. Leipsig, 1876. Supplemented by HERING, Neb. d. Bewng. d. sternform. Pigmentzellen n. s. w. in a communication by HOYER, centralbl. f. d. med. Wiss. 1869. Ne. 4. S. 49.
5. Zeitschrift f. wissench. Zool X. S. 153. 1860.
6. Jenaische Ztzchr. IV. S. 87. 1868.
7. Jenaische Ztschr. V. S. 543. 1870.
8. Entwickelungsgesch. d Siphonoph. Taf VI. Fig 93. Utrecht, 1869.
9. Mem. Bost. Soc. Nat. Hist 1867. Ph IX u X.

the external appearance and internal arrangement of cells during growth, new formation, division, and fecundation: chiefly by a greater rapidity and the want of all relation to growth and propagation and especially through the constant changes in direction. Here, however, as elsewhere, there exists no sharp boundary, as is shown by the appearances in the division of the *Protamœba*, *Amœba*, and colorless blood corpuscle, and by the streaming in the interior of growing cells and those which are preparing for the building of spores in many algae and fungi (10).

Concerning the History of protoplasmic motion, the oldest description I have been able to discover, proceeds from Rosel Von Rosenhoff (11). The "Kleine Proteus" which this excellent observer described and pictured in the year 1755, was a great fresh water amoeba.

Rosel distinguished the granular endosarc, the hyaline ectosarc (in Zartes ausseres Hautlin), portrayed the incessant change of form, the encystment in consequence of mechanical irritation, and the division: this latter, by the way, being the first direct observation of cell division. Not till nearly 20 years later, (1772) did Bonaventura Corti (12) make his well-known discovery of the rotation of cell protoplasm. ("Zellsaftes") in the *Characea*.

The further tracing of this phenomena in plant cells, was especially shown in the first third of this century by the observation of Meyen (1827 *Valisneria*, *Hydrocharis*). Robert Brown, 1831 (hairs of *Tradescantia*). Amici, and others.

The discovery by Dujardin (13), of the presence of an unformed contractile body substance in many lower forms of life (Rhizopods, Infusoria, Polypes, etc.) was of the highest moment. His descriptions of this substance, named by him Sarcode, are still excellent in essentials. He saw first the steaming of the granules in the pseudopodia of rhizopods.

---

10. In regard to the latter appearances, a Digest by W. Hofmeister. Die Lehre von der Pflanzenzelle. S. 45 f. Leipzig. 1867.

11. Rosel von Rosenhof. Der monatlich herausgegebenen insekten belustegungen dritter Theil S. 621–623. Taf. C. I. Fig. A. W. Nurnberg. 1755. The "Proteus" of which Baker wrote previous to this is *Trachelocerca olor*, a holotrichan infusorian.

12. B. Corti. Osservazioni micros. sulla Tremella e Sulla. circolazione del fluido in una pianta acquajola. Lucca. 1774.

13. Dujardin. Observ noun. sur les cephalopodes microscop. Bull, de la Soc. des Sc. natur de France. No. 3, 1835. Ann des Sc. natur III. 2 Ser. p. 312. 1835. Ibid IV. p. 343. 1835 (Sarcode).

Appearances of movements strikingly like that of sarcode, were soon found in the cells of higher animals. (Limax eggs, Dujardin, 1837. Planaria eggs, Siebold, 1841. Colorless blood corpuscles, Wharton Jones, 1846, and others.) Ecker (14) showed (1849) the intimate relationship of the various "formed" (muscle, cilia,) and "unformed" contractile substances of animals, and a year (1852) later Ferd. Cohn pronounced and maintained, with good ground, that the actively moving substance in the plant cell, which, since H. von Mohl (16) (1846) had been distinguished from PROTOPLASM, as "Zellsaft," or "the contractile substance, or sarcode of the Zoologist, if not identical, must still be extremely analogous formations." That it is not as was formerly considered under the old cell theories, the cell membrane which produced the contraction of animal cells, but rather the so-called cell contents was brought forward by Donders (18). The essential identity of the movements of animal and vegetal protoplasm, has been more closely demonstrated by Max Schultze (18), Unger (19), De Bary (20), Haeckel (21), Kuhne (22), and through the same investigations as well by Naegeli, Brucke, Heidenhain, Cienkowsky, Hofmeister and others. Upon the whole, the closer knowledge of protoplasmic movements and their conditions, has been accelerated manifoldly.

---

14. Alex Ecker. Zur Lehre vom Bau und Leben der Contraktilen substanz der niedersten Thiere. Ztsch. f. wissench. Zool. I. S. 218–249. 1849.

15. Ferd. Cohn. Nachtrage zur Naturgeschicte des *Protococus pluvialis.* Nova Acta Acad. Leop. Caes., etc. XXII. 2, S. 605. 1850.

16. H. Von Mohl. Ueber die Saftbewegung im Innnern der Zelle. Bot. Zeitung. S. 83. 1846.

17. F. C. Donders. Form, Mischung und Function der elementaren Gewebstheile in Zusammenhang mit ihrer Genese betrachtet. Ztschr f. wissensch. Zool. IV. S. 249. 1852. (Translated in the Nederl. Lancet. Derde Ser. I. S. 84 f. 1851-52.

18. Max Schultze. Ueber den organisms der *Polythalamien.* Leipzig. 1854. Ueber innere Bewegung erscheinungen bei Diatomen. Archir. f. Anat. a. Physiol. 1858, S. 330. Ueber muskelkorperchen und das was man eine Zelle zu nennen habe. Archiv. f. Anat. u. Physiol. 1861. S. 1. (From this article dates the assignment of the term PROTOPLASM to the contents of the animal cell.) Das protoplasm de Rhizopoden und der Pflenzenzellen. Leipzig. 1863.

19. F. Unger. Anatomie und Physiologie der Pflanzen, S. 273–284. Pesth. Wien. u. Leipzig, 1865.

20. A. De Bary. Die Mycetozoen. Ztschr. f. wissench. Zool. X. S. 88–174 (especially S. 121). 1859. Taf. VI.-X. A second greatly enlarged edition appeared under the title, Die Mycetozoen. (Schleimpilze) Leipzig. 1864.

21. E. H. Haeckel. Die Radiolarien. Berlin, 1862 (particularly page 89). Ueber den Sarkodekorper der Rhizopoden. Ztschr. f. wissench. Zool. XV., S. 342 (1865). and many other works. especially in the Jenaischen Zeitschrift

22. W. Kuhne. Untersuchung uber das Protoplasma, und die contraktilitat. Leipzig, 1864. also in arch. f. aust. u. Physiol., 1859. S. 564–748.

Universal attention was, through VON RECKLINGHAUSEN (23) (1863), turned to the wandering amœboid cells in animal tissues, and the significance of these wandering in many physiological and pathological processes in animal organisms, has since been proven by the same investigator as well as by STRICKER, COHNHEIM, and others.

II. PHYSICAL AND CHEMICAL PROPERTIES OF CONTRACTILE PROTOPLASM.

Contractile protoplasm appears optically as a homogeneous, transparent, usually colorless mass, of greater refractive power than water, and less than oil. In a few cases in which it appears in the form of thick fibres, or membranous strata, with a prevailing direction of movement (pseudopodia of *Actinospherium Eichorni*, cortical protoplasm of STENTOR) it becomes clearly doubly refractive and indeed, in conformity with muscle and vibratile cilia, the optical axis coincides with the direction of movement (24). Different parts of the same mass of protoplasm may have different refractive powers. Usually, in naked amœboid protoplasm the outer layer is more refractive than the inner. In the pseudopodia of *Actinospherium* and many rhizopods, one may distinguish a strongly refractive axial layer.

During movement the refractive power of the inner part frequently changes to somewhat wider boundaries.

In regard to mechanical properties, protoplasm usually appears as a more or less viscid fluid, not miscible with water, possessing moderate cohesion, great extensibility, somewhat defective elasticity, and a tendency to assume the form of drops. These properties, moreover, vary as well for dfferent parts of the same as for different kinds of protoplasm, and frequently change in the same place after a short time.

In naked amœboid protoplasm, the outer layer is generally more firm than the inner, it may even become either permanently or transiently, a somewhat firm membrane. While this is not usually the case, yet at any chosen part of the investing layer, firm bodies may be found and easily observed in every instance by means of particles of coloring matter, (indigo, carmine, etc.) (25).

---

23. F. VON RECKLINGHAUSEN. Ueber Eiter und Bindegewebs korperchens. Arch. f. pathol. anat. XXIII. 3, 157. Taf. II. 1863.

24. Arch. f. d. ges. Physiol. XI. S. 449 u. 454 f. 1875.

25. E. HAECKEL. Die Radiolarien, S. 104-106. VON RECKLINGHAUSEN. Archiv. f. path. Anat. XXVIII. S. 184. W. PREYER. Ibid. XXX. S. 420. M. SCHULTZE. Arch. f. microscop. Anat. I S. 23.

In many instances, however, the interior is more firm and the investing layer very soft, and often sticky (pseudopodia of many rhizopods, *Actinosphæra*, and others).

Almost without exception, the protoplasm conceals inclosures which play a passive roll in the movements, (without reference to accidental occurrences, as the taking up of firm bodies from without, or to nuclei,) they are especially granules and vacuoles, mostly of extremely small size, the former either appearing in great numbers or very scattering. The majority appear to be albuminoid, others fatty, again others unorganized matter (e. g. Carbonate of Lime, in a few of the myxo-plasmodia). Pigment granules are rarely found (some *myxomycetes*, *Protamœba aurantiaca*, etc.)

Usually we find the granules exclusively in the central part of the protoplasm.

One may often distinguish a somewhat thick, hyaline, cortical layer, and a granular and hence opaque inner mass (especially manifest in amœba and myxoplasmodia). Both can at times be very sharply distinguished from one another. They are accustomed however, during movement, continually to mix and again separate.

When granular protoplasm forms itself into very thin fibres (pseudopodia, of Rhizopods, Radiolaria, etc., network of Noctiluca, and many plant cells), the granules are often prominent over the surface, indeed they are often pre eminently in the outer stratum. Foreign particles frequently adhere to the naked protoplasm, and are carried on in the same way as its own granules (Rhizopods, Oscillaria, Diatoms, etc). Protoplasm, containing many granules, appears in general to have less cohesive power than that free from granules, and the granular contents of myxo-plasmodia flow about inside of the firm covering, like a thin emulsion in a tube. Not rarely, the granules show an irregular trembling and dancing, which is characteristic of the Brownian or molecular movement, as for example, in the endoplasm of Vorticella, in the contents of many of the myxomycetes, and in the protoplasm of many plant cells, these movements may, at times, be discovered in the vacuoles.

It appears that the entire protoplasm in those places nearest the more coherent parts has a thinner fluid.

On the surface of very thin protoplasmic threads (e. g., many plant cells, pseudopodia of Rhizopods), the movement of the granules is also much greater than in the more hyaline axis.

Such threads as the common mucus threads, flow readily together in the formation of a web, which is not easily accomplished by a protoplasmic mass surrounded by a hyaline layer. Moreover, that this confluence does not always depend alone, upon the previous cohesive power of the substance, follows from that most noticeable fact that the pseudopodia of different individual rhizopods (26), as well as the processes of specifically different plasmodia (27), never coalesce.

Without doubt, the above difference of cohesive power is conditioned by the varying amount of water imbibed, it having been already shown that the cohesion is synonymous with the varying refractive index. Similar differences in cohesion with corresponding changes of volume and refractive power, may be artificially produced by such materials as cause shrinking, or swelling of the protoplasm (see further on). In readily moving protoplasm rich in granules, there is a separation of fluid in the form of small drops (Vacuoles), in consequence of which the protoplasm acquires a foamy appearance.

In quiescent protoplasm the form of these vacuoles is usually purely spherical. They may be much distorted during movement, but there is always a tendency to return to the spherical form. The same holds true in regard to the form of the air bubbles (28) which have been observed in some cases (*arcella*, *amœba*).

In regard to the chemical composition of pure protoplasm, one is really referred to the micro-chemical reactions, but the present knowledge on this subject is extremely barren. No chemical characteristic in particular, is given which distinguishes contractile from noncontrac tile protoplasm.

In life the reaction is usually weakly alkaline or neutral (29). In *Æthalium septicum* it is always distinctly alkaline (30). Nevertheless, I have seen granules of blue litmus become red and remain so, within a few minutes after their reception within the contractile endoplasm of

---

26. MAX SCHULTZE. Das Protoplasm der Rhizopoden und der Pflanzenzellen, S. 25. 1863.

27. CIENKOWSKY. Entwickelungsgeschicte der Myxomyceten. Jahrb. f. wissensch. Bot. III. S. 335. 1863. DE BARY, Die Mycetozoen 2 aufl. 3. 40. 1864.

28. TH. W. ENGELMANN. Bertrage z. Physiol. d. Protoplasma. Arch. f. d. ges. Physiol. II. S. 307. 1869. Zool. Anzeiger I. S. 152. 1878.

Stylonychia mytilus and *pustulata Paramecium aurelia* and *Amœba diffluens.* We find from 10 to 20 per cent. of the entire weight of protoplasm, made up of firm substances, of these, albuminous bodies form, without doubt, the chief mass. Several different albuminous bodies are to be identified, among which at least one, coagulating at low temperature (mostly under 50° C.), besides these there are never wanting hydrocarbons (in the plasmodium of *Æthalium* there is present a great quantity of a glycogenic substance) (31) fats and inorganic material, especially potassium combinations. Lecithin appears likewise frequently to be present. The peptone Enzym (32) has been found in the plasmodium of *Æthalium septicum.*

III. THE SPONTANEOUS MOVEMENTS OF PROTOPLASM.

Protoplasmic movements exhibit usually, a great difference and changeability in manner of appearance, such a multiplicity of forms, in short, that it is impossible to give a proper description of all. One can nevertheless distinguish certain types in the description of which we must be allowed to hint the existence of plentiful intermediate forms.

1. *Movements of naked protoplasm. (Vid Fig. 1.)*

Three chief types can here be distinguished which may be designated as amoeboid movements, the streaming of protoplasmic threads, (Tradescantia, etc.) and gliding movements.

AMOEBOID MOVEMENT expresses itself in the projection and withdrawal of smooth, round, or conical processes. In the beginning these are usually hyaline, the granular mass *from the inner main portion streaming in and out of them* (33).

These processes may remain unbranched or they may become branched, or form nets. In the simplest case which belongs here, one sees only slow, inconsiderable fluctuations in the exterior form of the mass, whereby its position is not changed. Thus it is with the ova of many vertebrate animals before fertilization. More complicated appear-

---

29. TH. W. ENGELMANN. Ueber die Flimmerbewegung. Jenaische Ztschr. f. med. u. Naturw. IV. S. 469. Anm. 1868.

30. DE BARY. Written communications. C. F. W. KRUKENBERG. Unters, d. physiol. Instit. d. Uni. Heidelberg II. S. 273. 1878.

31. W. KUHNE. Written communications.

32. KRUKENBERG. *loc. cit.*

33. First and very carefully described by O. FB. MULLER. Animalcula infusoria, etc., p. 10. 1786.

ances are shown by the *Amœba*, *Myxamœba*, *Arcella*, *Difflugia*, many *Monera*, many animal ova (Hydra, Sponges), the white blood-corpuscles of most animals, pus-corpuscles, wandering cells in connective tissue, and many epithelial cells (as the epidermal layer of the frog), etc. Here we find extensive and often very lively streaming in the interior, which is mostly rich in granules, accompanied by a constant change in form, through the arising and vanishing of processes, which have divers appearances, but remain almost constantly without fusion. Since the processes attach themselves to firm bodies, they are able, by shortening, to draw after them the remaining protoplasm, thus effecting a change of position. THE RAPIDITY of this last proceeding, varies according to time and circumstances, but always remains microscopic. It is very seldom that an amœba moves $\frac{1}{2}$ m.m. in the space of a half minute. The STRENGTH of amœboid movement is able to reach considerable amount. The wandering cells of the epithelium of the frog, move, for example, between the fibrillæ and lamellæ, others penetrate between epithelial cells, thereby forcing them apart.

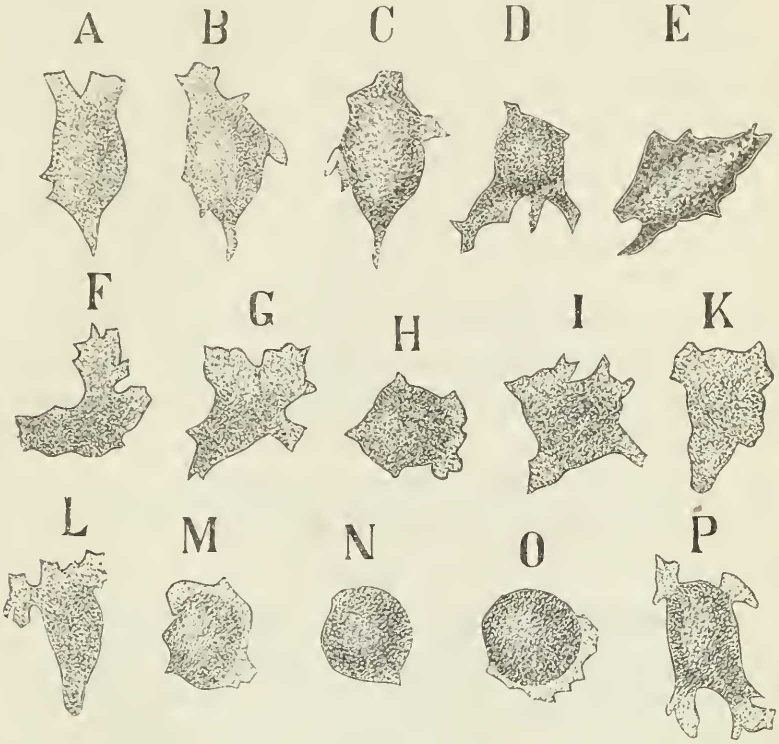


FIG 1.—A COLORLESS BLOOD-CORPUSCLE FROM THE FROG, UNDER THE INFLUENCE (UP TO *M*) OF INCREASING, AND AFTERWARDS OF DECREASING TEMPERATURE.

A—P. *Fig.* 1 *indicates the different forms assumed by the same colorless blood corpuscle in the course of a few minutes* (*for a fuller description, see further on*).

The amœboid movements in the plasmodia of the myxomycetes, appears to be the most diversified and accessible for examinations on account of the greater dimensions of the protoplasmic mass, and usually greater rapidity of the movements (sometimes macroscopic). By the blending or fusion of the processes, protoplasmic networks are generally formed, which at times cover surfaces of several square centimetres. A. DE BARY (34) portrays the movement as follows: "They are of "two kinds. First, one sees in each partially transparent plasmodium, " the greater part of the granules maintaining a lively motion. In each " thread-like branch the stream runs always parallel with the length of " the branch, and in the branchlets divides itself frequently in accord-"ance with the branching, or that of the last flows all into the chief "stream. Frequently the streaming continues only in the side " branches, while in others, an opposite, or no movement at all, predom-" inates.

" In smooth membranous expansions, we see plentifully branched " streams, running either in the same or in different directions and fre-" quently opposing streams run side by side. The peripheral substance " through which runs the granular stream, shows, for the most part, an " apparently independent movement which consists in a steady flowing " or undulating change of outline, and alternating protrusion and with-" drawal of smaller twigs and processes. The granules often do not " participate in these movements, oftentimes they appear in greater or " less numbers in the small tentacle-like branches. The energy of the " peripheral movement varies greatly, often one notices by continued " observation, only slight changes of outline, and the flat expansion often " has the appearance of a perfectly quiet lamina, thickly covered with " motionless granules which are being drawn along by the stream. In " the last case particularly, it has often the appearance as if the plas-" modium were composed of two kinds of quite different substance, the " one a streaming fluid rich in granules, the other viscous and flowing " slowly, and as though the first moved within the other in firm walled " canals. But one sees frequently, in transparent portions of the plas-" modium, new streamlets originate, while the granules of a quiescent " portion suddenly start into motion towards the chief stream, and others

---

34. A. DE BARY. Die Mycetozoen, 2 Edit., p. 43. Leipzig, 1864.

"cease moving and assume, to the fullest extent, all the qualities of the "portions free from streaming. The quiet granules on the edge of a "strong stream, may suddenly fall into motion with it, and the "sharp boundaries between the streaming and resting portions, disappear. On observing the stream which returns from the branches, one "notices two appearances, either the ends are strongly retracted and are "found unmistakably in a condition of energetic contraction, the "streaming being most active near the end, and diminishing in rapidity in a centrifugal dfrection (in the direction towards which it flows), "or the ends from which the stream is returning sink slowly together, "the rapidity increasing in a centrifugal direction.

"When there is a vigorous stream running in the branches, allowing "of a rapid swelling of these and the putting out of new branches, it "appears as though the granular mass were being forcibly pressed into "the ends.

"If one seeks for the situation of the propelling power and traces the "stream towards its source, one finds nowhere in these cases, a change "of outline, which, from the strength of the stream, would indicate "a corresponding contraction of the part from which the stream "proceeds; on the contrary it is very plain that the streams coursing in the branches increase in rapidity in a centrifugal direction."

According to Hofmeister (35), the formation of a new current in Myxomycetes may be explained as follows: Let A———B be a stream in which the movement is from A to B; clearly there will be an aggregation of protoplasm about B. When the current in the direction of A B, stops, the new one in the reverse direction, B A, begins at A by the movement toward it of the particles nearest to it; next the particles further off, move toward A; after this, those still further off, and so on. The current *extends backward.* So, also, when a stream begins *de novo,* it is propagated backward from the point of beginning. These facts are conformed by amoeboid movement in many other cases and are theoretically of importance.

Streaming of Protoplasmic Threads *(Vid. Fig. 2)* is found in many of the rhizopods (*Heliozoa* and *Radiolaria*) and in some of the *Monera.* In this form, thin and long protoplasmic threads originate, usually in great numbers, from the protoplasmic body—the so-called pseudopodia, root-feet—on whose surface fine granules main-

---

35. W. Hofmeister. Die Lehre von der Pflanzenzelle. p. 17. Leipzig, 1867.

tain a vigorous streaming. At times the fibres show none at all, and at other times very slow changes in form, which consist in uniform lengthening and shortening, the formation of varices, in writhing, bending and the formation of branches.

They have the power of withdrawing themselves entirely within the contractile body mass. When they come in contact they easily run together in the formation of a mesh work.

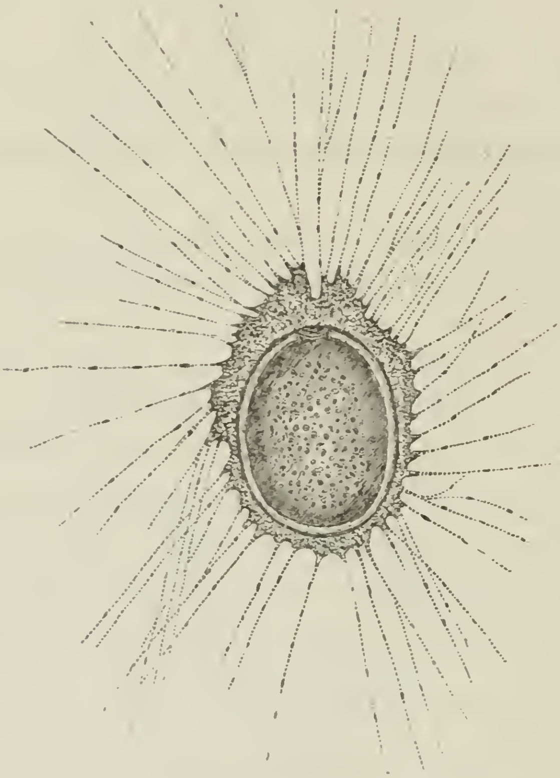


FIG. 2.—A HELIOZOAN OR SUN-ANIMALCULE, SHOWING THE STREAMING OF PROTOPLASMIC THREADS, CHARACTERISTIC OF FILOSE PROTOPLASTS.

The characteristic phenomena of the granular movement has been portrayed in the following manner by Max Schultze (36):

" It is a gliding, a flowing of the granules which are imbedded in the " fibre substance, with greater or less rapidity they are drawn in the fibre " toward the peripheral end, or in a reverse direction; often, even in " the thinnest fibres, in both directions at the same time. Granules

---

36. M. SCHULTZE. Das Protoplasma, etc., p. 11.

" which meet, are either drawn past each other or move about one-" another until, after a slight pause, each continues its original direc-" tion, or one takes the other with it. Like as the promenaders upon a "boulevard, do the granules, in a broad thread, swarm amongst each " other, sometimes stopping and trembling, yet always following a cer-" tain direction corresponding to the length of the thread. Often they "stop in the midst of their course and turn about; mostly however, " they attain the extreme end of the thread, and only here change the " direction of their movement.

" The granules of a thread do not all move with equal rapidity, so " that one often overtakes another, the faster driving the slower to " greater speed or slackening its pace to that of the slower. When sev-" eral threads come into contact, we see the granules of one thread " passing over to the others; at such a place broad lamellæ are often " formed and from which are developed independent processes, or in " which those already existing, are merged. Evidently many granules " run upon the extreme surface of the fibre above which they are seen " projecting; perhaps all may have this superficial position. Besides " the smaller granules, one often sees larger masses, like spindle-shaped " swellings, or visible protruberances of a fibre with a motion similar to " that of the granules. Even foreign bodies which become attached to " and are finally taken into the substance of the thread, follow this " movement."

The greatest hitherto observed rapidity of a single granule (SCHULTZE in *Miliola*) measured 0.02 min. a second. It is usually considerably less and extremely indolent, for example, in the Sun-animalcule.

GLIDING MOVEMENT. (37)

The peculiarity of this variety of movement is that to the outer surface of the cell covering is attached an extremely thin protoplasmic layer, free from granules, and by means of which, the entire body glides or creeps forward on a firm support. Firm bodies adhering to it can be shifted along its surface. The line of movement is usually direct (as in Diatoms) or spiral (*Oscillaria*), sometimes forwards and sometimes backwards.

The rapidity of the movement rarely exceeds 0.04 mm. per second, and changes in the same individual, almost constantly. Evidently the strength employed must be considerable.

---

37. Many botanists following the example of NAGELI, make use of this expression to signify the streaming of granules upon the surface of protoplasmic threads.

Most *Bacillaria* (boat-like movements of the diatoms) *Oscillaria*, and embryonic stages of *Nostoc and Rivularia*, show this type of movement. The protoplasm on the surface of the above named organisms, is never visible during life on account of its extreme tenuity and its lack of refractive power. Formerly its existence was only concluded from the appearance of the motion (38). It has, however, been made evident in many cases. by those substances which produce coagulation of protoplasm (39).

2. *Of Protoplasm limited by a Firm Membrane. (Vid. Fig. 3.)*

This form of movement is chiefly seen in plants. Botanists distinguish two chief types, CIRCULATION and ROTATION.

CIRCULATION. In this type the cell is lined with a thin layer of contractile protoplasm, threads from which, of varying number and constantly changing position, form, and dimensions are drawn through the fluid forming the cell. In direction and rapidity, the movements are, in general, unstable. being often entirely different in directly contiguous portions. The threads, by fusing together, form net works which usually show a granular streaming, and conduct themselves in general, essentially like the pseudopodia of rhizopods. Wherefore, we may be allowed to refer to the description of these latter which we have already given. This type of movement is seen in numberless plant cells and is brought to special perfection in plant hairs (*Curcubita*, stamen hairs of *Tradescantia (Vid. Fig. 3)*, and others). It is further seen in the *Noctiluca*, *Dicyemida* (endodermic cells), in the cartilaginous cells in the tentacles of *Medusæ* and on the branchial filament of the *Branchiomma*, in cartilage cells, etc.

ROTATION. The protoplasm forming the wall layer (with the exception of the extreme outermost portion) rotates about the interior of the cell; generally as a connected mass; in a constant path, and with a uniform rapidity. The movement is nearly always parallel to the greatest circumference of the cell.

Enclosures such as nuclei, chlorophyll granules and crystals, frequently rotate along with the protoplasm without any considerable change in relative position. The best known examples of this form of

---

38. MAX SCHULTZE. Ueber die bewegungen d. Diatomeen. Arch. f. microscop Anat. I. p. 376. 402. Taf. XXIII. 1865.

39. TH. W. ENGELMANN. Ueber die Bewegungen der Oscillarian und Diatomeen. Arch. f. d. ges. Physiol. XIX. p. 8. 1878.

movement are given in the cells of *Chara.* The leaf cells of *Valisneria spiralis*, and *Ceratophyllum submersum*, and in the root hairs of *Hydrocharis morsus ranæ.* To this division belongs also the rotation of the endoplasm of *Paramæcium bursaria* and *aurelia*, and some of the other infusoria (*Vorticella* for example).

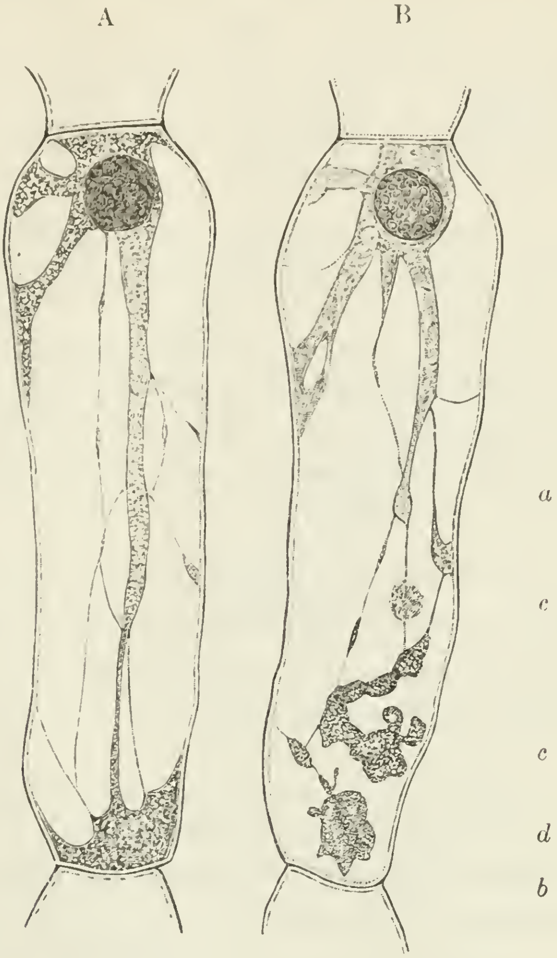


Fig. 3.—Cells from the Stamen-hairs of Tradescantia (after Kuhne).

A, Fresh in water. B, The same cell after moderate local electrical irritation. The region of irritated protoplasm extends from *a*–*b*. *c*–*c*–*d* represent the spherical and club-shaped masses produced by contraction of the protoplasmic threads.

IV. General Conditions of Spontaneous Protoplasmic Movement. (40)

1. Temperature.—For all contractile protoplasm there is a higher and a lower temperature at which the spontaneous movements cease under all circumstances. The minimum lies mostly in the neighborhood of 0°, the maximum generally about 40°.

The province of manifest contractility is included between these two temperatures, in general increasing rapidly with the temperature, in some cases a certain degree of temperature corresponding to a certain constant rapidity of movement. This, however, no longer holds true, if a short time before, a rapid and extensive fluctuation of temperature has taken place, such a condition acts as a mechanical or electrical irritant and will be treated of further on.

For an equal increase in temperature the increase in rapidity appears in many cases, to fall off, the higher the absolute temperature.

NÆGELI (41) saw in an end cell of *Nitella Syncarpa*, which was gradually warmed under the microscope, the superficial stream of protoplasm, pass over the distance of 0.1 mm. at 1° C. in 60 seconds, at 5° in 24 seconds, at 10° in 8 seconds, at 20° in 3.6 seconds, at 31° in 1.5 seconds, at 37° in 0.6 seconds.

SCHULTZE (42) knew to the contrary, that at ordinary temperatures this movement was very considerable, at least 0.02 mm. per second.

The rapidity of the movement of the granules in *Miliola*, not being much accelerated by further warming.

There is, in every case, a certain high temperature at which the movements reach a maximum of rapidity, evidently of unlimited duration. This OPTIMUM TEMPERATURE usually lies several degrees below that of the maximum. If the temperature mounts above this optimum the movements at first become more vigorous, but after a time, gradnally cease, and so much the earlier the nearer the prevailing temperature lies to the maximum, when it reaches this last, movement is instantly extinguished. The protoplasm is then found in a condition of apparent death or rigidity—TRANSIENT HEAT RIGIDITY OR HEAT TETANUS—in which it continues contracted to the smallest possible surface, as if held by strong artificial stimulants, until it is freed by cooling, that is, when it is again able to resume its movements. The optical characteristics of protoplasm do not appear to be obviously changed by the above conditions.

---

40. The more important articles are DUTROCHET, Compt. rend. II. p. 775, 784. 1837 (Chara); MAX SCHULTZE. Das Protoplasma der Rhizopoden, etc., 1863; W. KUHNE. Unters Ueber das Protoplasma. etc., 1864.

41. C. NÆGELI. Beitrage zur wissensch. Botanik. 2. Heft. S. 77. Leipzig, 1860.

42. MAX SCHULTZE. Das Protoplasma, etc., p. 47.

Masses of naked protoplasm of microscopic minuteness, as *Amoebæ*, colorless blood corpuscles, etc., become spherical upon being gradually heated to the maximum. The protoplasmic threads of rhizopods, plant cells, etc., usually become at first, varicose and finally retract within the chief mass of protoplasm. Fig. 1 represents the different forms which a colorless blood corpuscle of a frog assumes under the influence of an increasing and again diminishing temperature. Each stop of five minutes' duration, thus from A—C, temperature was 12° C, corresponding to which the form changed only a little. At C the microscope with the preparation, was placed in a Sach's warm-chest filled with water at 50° C. After a few moments the movements became notably more vigorous and the cells crept forward with continually increasing rapidity, up to—L—at—M—began, and at—W—was completed the transient heat tetanus. At—N—the preparation was removed from the warm-chest to ordinary temperature (12° C). At—O—the changes in form again commenced, and at—P—were very vigorous.

When the temperature advanced above the maximum the protoplasm died instantly. At a certain degree of temperature which we will designate the ULTRA MAXIMUM, the albumen coagulated, producing turbidity and shriveling, vacuoles frequently making their appearance. This heat death, or PERSISTENT HEAT TETANUS, also took place gradually by a longer warming at a somewhat lower temperature. Cooling had naturally no effect toward reviving it. A fresh water amoeba which was warmed for one minute after the temperature had reached 35°, exhibited only a temporary stiffness.

KUHNE (43) found, " after fifteen minutes exposure to the same temperature (35°)," complete coagulation, and permanent immobility. " After shorter warming at 40°, it presented the appearance of a spheri- " cal bubble, sharply and doubly outlined which enclosed turbid masses " —appearing brown by transmitted light.—adhering, as a rule, firmly " to one side of the periphery and occupying, perhaps, three fourths of " the cell cavity ; the remaining portion being filled with a clear trans- " parent fluid in which minute granules were swarming in lively mole- " cular movement."

KUHNE later immersed such an individual in water of 45°, and the molecular movements ceased in the hitherto clear portions of the sphere

---

43. W. KUHNE. Untersuchungen ueber das Protoplasma, etc., p. 43.

and here a firm coagulum was also formed (44). By a sudden onset of the heat tetanus, protoplasm, occasionally has no time to change its form.

M. SCHULTZE (45), for example, saw the protoplasmic threads of *Miliola* by rapid heating to at least 45°, become rigid in the positions which they had just occupied, a similar appearance was given in *Tradescantia.* In regard to the value of the maximum and ultra maximum in different kinds of contractile protoplasm, the following table gives some results. The heat was endured :

In Didymium serpula. the max. about	30°c.,	*the*	*ultrasmax*	*about*	35°c. (46)
In Æthalium septicum, the max. about	39°c.,	"	"	"	40°c. (47)
In Actinosphaer Eichorni, the max about	38°c..	"	"	"	43°c. (48)
In Miliola, the max. about	38°c..	"	"	"	43–48°c. (49)
In Urtica urens, the max. about	44°c.,	"	"	"	47—48°c. (50)
In Tradescantia Virginia, the max. about	46°c..	"	"	"	47—48°c. (51)
In Valisneria spiralis, the max. about	40°c.,	"	"	"	47—48°c. (52)
In Nitella syncarpa, the max. about	37°c.,	"	"	"	—— (53)
In Chara flexilis, the max. about	——	"	"	"	45°c. (54)

When the temperature sinks gradually to the minimum, spontaneous movements gradually cease. This produces, usually, a simplifying of the form, the processes or branches which were present, being slowly withdrawn and no new ones formed. Under these circumstances, as was observed by KUHNE in *Amoeba diffluens* and *Actinosphærium*, the contracted form remains unchanged. Optical changes do not accompany the onset of this COLD TETANUS, although HOFMEISTER (55) observed that the wall layer of protoplasm in *Curcubita*, after long continuance at 0°, became frothy and rich in vacuoles. Sensibility to artificial irritation, is still retained, and an increase of temperature above the minimum again produces the movements. It appears that contractile protoplasm can sustain a much lower temperature than the minimum, for an entirely unlimited time. A lowest temperature (ULTRA MINIMUM) at which unavoidable death occurs, is not yet known. Protoplasm be-

---

44. Ibid p. 44, 45.
45. M. SCHULTZE. Das Protoplasma, etc., p. 22.
46. KUHNE. Unters ueber das Protoplasma, p. 87.
47. Ibid.
48. SCHULTZE. Protopl. p. 34.
49. Ibid, p. 38.
50. Ibid, p. 45.
51. Ibid, p. 48.
52. JURGENSEN. Stud. d. physiol. Instit. I p. 104. Breslau, 1861. SCHULTZE. a. a. O. p. 48.
53. NÆGELI. Beitr. z. wissensch. Bot. II. S. 77.
54. DUTROCHET. Compt. rend. 1837. II. S. 775.
55. W. HOFMEISTER. Die Lehre von der Pflanzenzelle. p. 55.

ing thawed out after having been frozen, may, under certain circumstances, resume its spontaneous contractions. And it would not always appear necessary, that the thawing follow very slowly; a condition which, it is well-known, is very essential for the reanimation of other organic substances rich in water.

Kuhne (56) allowed the stamen hairs of *Tradescantia*, without the addition of water, to freeze quickly to the wall of a thin platinum crucible, which had been cooled down to 14°. They were unable to remain longer than five minutes in this temperature without dying. Being taken out and quickly immersed in water, they showed no trace whatever of protoplasmic network, " but rather the violet interior of the " cells, contained a great number of separate round drops or masses in " the vicinity of the naked nucleus." A few seconds later these began to show a vigorous amoeboid movement, and after a few minutes began to run together into larger drops, which, in turn, uniting with one another, formed layer groups and in about ten minutes, re-established the original protoplasmic network in which lively streaming could be noticed twenty-four hours later.

Hofmeister (57) essentially confirmed these observations.

2. Hygroscopicity.—In regard to this it is the same as regarding the temperature. There is for all protoplasm a maximum and minimum capacity for the imbibition of water. Close determination is wanting, yet the minimum may average below 60 per cent., and the maximum over 90 per cent. Within these limits the energy of the movements increases in general with the amount of contained water, with a corresponding increase of volume, and dimination of the refractive co-efficient. Rapid change in concentration of the medium, causing rapid swelling or more especially, shriveling, act in a manner similar to irritants (see below).

An optimum of contained water is shown in every cell. At a gradual approach to the maximum, the form of the protoplasm is simplified to the greatest possible degree (becoming spherical, forming varices, etc.). The withdrawal of water by means of neutral substances (as a thin solution of sugar, chloride of sodium, etc.), brings back the move-

---

56. W. Kuhne. Unters, ueber das Protoplasma, etc., p. 100.
57. W. Hofmeister. Die Lehre von der Pflanzenzelle. p. 54.

ments after the lapse of a minute or so. This is called WET TETANUS. By a longer continued treating with distilled water, the protoplasm dies.

The appearances in these cases are not always the same, the protoplasm may form vacuoles, flow together, or become coagulated. In the latter case it may retain for some time the form corresponding to its uncontracted condition (58).

The withdrawal of water through neutral solutions or by evaporation, leads likewise to a transient or continued rigidity DRY TETANUS. As discovered by AL BRAUN (59) in *Chara*, the protoplasm which lies nearest the cell wall in plants, is frequently withdrawn in the form of a sack, after which the movements may continue for a long time. Naked protoplasm (*Amoebæ*, *Myxomycetes*), in which shrinking has been caused by a 2 per cent. solution of sodium chloride, is frequently covered with a great number of fine, pointed, hyaline, cilia-like processes; after being diluted with water it returns to its original condition (60).

Protoplasm which has been completely dried in the air at ordinary temperatures, may again revive, even after years, upon the addition of moisture. This may be exemplified in encysted amœbæ and infusoria, it has also been observed in naked plasmodia, and has been proven in many other cases, among which were some very highly organized beings. It is important to notice that many forms of protoplasm (whether all or not ?) which can accommodate themselves to a solution gradually concentrated, are injured or instantly destroyed by a more rapid influence. It does not appear that shriveling follows to any extent.

In sea water which I kept for more than a year, and whose proportion of salt gradually reached 10 per cent. through evaporation, there lived, with apparent ease, numerous protozoa, worms, arthropod, dia-

---

58. Recent accounts by M. SCHULTZE. Das Protoplasma. ete , p. 21. (*Miliola*). p. 42. (*Tradescantia*) by HOFMEISTER, Pflanzenzelle p. 53. *Hydrocharis*.

59. AL BRAUN. Monatsber. d. Berliner Acad. 1852. S. 225. Further by HOFMEISTER, a. a. O., p 52.

60. KUHNE. Untersuchungen, etc , p, 48 and 82. Compare, also, DE BARY. Die Mycetozoen. 2 edit. p. 46. Taf. II. Fig. 16, III, 11 and 12 HOFMEISTER. Die Lehre von der Pflanzenzelle. p 24, Fig. 8. V. CZERNY. Einige Beob. uber Amoeben Archir. f. microscop. Anat. V. p. 159. 1869. STRASBURGER. Studien uber das Protoplasma Jenaische Zeitschr. f. Naturwissensch. X. p. 407. Jena 1876. According to most of these observations. which I confirm, these cilia-like processes may also originate without reference to the concentration changes of the surrounding medium, often by the contraction of a process or pseudopod.

toms, green algæ, etc., etc. (61). CZERNY (62) knew of fresh water amoebæ living for more than a week in a 4 per cent. solution of salt. I have also found similar cases. According to KUHNE (63), under the sudden influence of a 10 per cent. solution of sodium chloride, fresh water amoebæ assume spherical forms, which soon become flattened and throw out nets of fine mucous threads, while the rest dissolves into coarse and fine granules which travel about one-another in lively molecular movements. Marine amoebæ behave in a similar manner.

3. OXYGEN.—Protoplasmic motion is undoubtedly able to continue in a medium entirely free from oxygen, but for a short time only, at the most, some hours. The gradual stagnation can at first be overcome by the introduction of oxygen, and by this means alone.

In reference to the dependence of the energy of the motion upon the pressure of oxygen in the surrounding medium, this much may be said with safety, that the movements in many cases (whether all?) maintain a maximum at very little and far beneath the normally continuous pressure.

At very high oxygen pressure (3–6 atmospheres), they are diminished and again accelerated with diminished pressure. Evidently the living protoplasm chemically binds the oxygen of the neighborhood, and the firm union thus originated, of which (under normal conditions) a certain supply must exist in every protoplasmic body, is constantly being destroyed, probably with the separation of carbonic di oxide,

CORTI saw the streaming cease in the cells of *Chara* when the air was excluded by olive oil ; the same took place after long continuance in a receptacle exhausted by the air-pump.

HOFMEISTER (64) observed that *Nitella* became stagnant after five minutes in olive oil and also after thirteen minutes in a rarified chamber. In the first case it was thirty minutes, in the second, twenty-two minutes after the entrance of air before movements began. KUHNE (65) having replaced atmospheric air with purified hydrogen, found that fresh water amoebæ lay perfectly motionless on the floor of the drop for

---

61. Compare DUTROCHET. Compt. rend. 1837. II. p. 781 and 782.
62. V. CZERNY. Arch. f. microscop. Anat. V. p. 158, 1869.
63. KUHNE. Unters. uber das Protoplasma, etc., p. 48. Compare also, CZERNY. Place already cited.
64. W. HOFMEISTER. Die Lehre von der Pflanzenzelle, p. 49.
65. W. KUHNE. Unters uber das Protoplasma, etc., p. 52 (*Amoeba*), p. 68 (*Actinosphærium*), p. 90 (*Myxomycetes*), p. 107 (*Tradescantia*).

more than twenty-four minutes after the introduction of the gas. (They re-acted like fresh individuals from this condition, upon the electric shock, but the irritation must have been very severe.) Within seventy-five minutes after the entrance of air, the spontaneous movements again took place. Plasmodia of *Myxomycetes* and also the hairs of *Tradescantia*, ceased movement only after several hours introduction of hydrogen, but it was only a few moments after the introduction of air till they were in full motion, and revivification by air was still possible twenty-four hours after the stagnation from hydrogen.

I found contractile cells from the lymph sacs of the frog, become motionless only after two hours' introduction of the purest hydrogen, through a hermetically sealed moist chamber. They mostly became spherical, as did also fresh water amoebæ. A drop of solution of Hæmoglobin in a similar situation for ten minutes, showed in the micro-spectroscopic apparatus, nothing of the two absorption bands of the oxi hydrogen blow pipe, that were previously present. After a long continuance in pure hydrogen, protoplasm finally dies, the phenomena being accompanied by turbidity, formation of vacuoles and finally decay. The effect of compressed oxygen was investigated by TARCHANOFF (66), in an annex to PAUL BERTS' discovery of the devitalizing influence of this agent. He saw the white blood corpuscle of the frog under a pressure of from 3–6 atmospheres of oxygen, become round and motionless, the movements being renewed, however, at the ordinary atmospherical pressure.

IV. OTHER CHEMICAL CONDITIONS.—POISONS.

As in all life-manifestations by elementary organisms, the spontaneous movement of protoplasm appears unable to continue for a long time unless the reaction of the fluid imbibed be neutral, or varying only slightly from a neutral reaction. Only a slight excess of alkali, and especially of acid, tends to produce stagnation, which in its commencement may again be restored to movement through the removal by neutralization of the relative excess. DUTROCHET (67) saw the movement of *Chara* definitely extinguished in a 0.05 per cent. solution of potassium after thirty-five minutes; in potassium or sodium of 0.1

---

66. TARCHANOFF. Publications of the St. Petersburger Gesellsch. d. Naturf. VII. p. 122, 1876. I only know HOYER and MAYZEL'S reference to this, in HOFMANN and SCHWALBE'S Jahresber., etc. V. Literatur., 1876, p. 22.

67. DUTROCHET. Compt. rend. 1837. II. p. 781.

per cent. after two or three minutes; in tartaric acid of 2 per cent. after ten minutes; in the same of 1 per cent. after one hour.

Max Schultze confirmed the injurious influence of dilute acids (*Hydrochloric*, *Acetic and Osmic*), and dilute alkalies in *Miliola* (68), *Actinosphærium* (69), *Tradescantia* (70); and Kühne saw the same effect in *Amoeba* (71), *Actinosphærium* (72), *Myxomycetes* (73), and *Tradescantia* (74).

In dilute caustic alkalies the protoplasm swells very much, and finally dissolves or becomes flattened. The normal movements have been observed to be often accelerated before stagnation takes place (75). In dilute acids death usually begins with turbidity and shrinking (coagulation of the albumen) (76).

Carbonic Acid can only produce this result when it is conveyed for some time over the preparation in a concentrated stream (77). The movements which have been suspended by weak CO_2, can only be restored by air; and frequently only by hydrogen, which causes any turbidity that may have resulted to disappear.

The vapor of Ether and Chloroform produces effects similar to CO_2,—transient or persistent paralysis with coagulation. It requires only small quantities to be mixed with the air to produce this effect. At the commencement, however, the movements may be easily restored again by washing with pure air (78).

The influence of Veratrin is especially noticeable on account of the especial agreement between its poisonous influence upon many forms of protoplasm and that which it exercises upon the contractile

---

68. Max Schultze. Das Protoplasma, etc., p. 22 and 37.
69. Ibid, p. 32.
70. Ibid, p. 42.
71. Kuhne. Unters, uber das Protoplasma und die Contraktilitat, p. 49. (HCL. of 0.1 per cent. Potassium of 0,1 per cent. and 1 per cent.)
72. Ibid, p. 64. (HCL of 0.1 per cent., Potassium of 0,1 per cent., Ammoniacal fumes.) P. 67. (CO_2).
73. Ibid, p. 85. (Ammoniacal fumes), p. 89 (CO_2).
74. Ibid, p. 100. (HCL, KOH.)
75. By Dutrochet (as already referred to, p. 781) in *Chara*. By Kuhne (at place mentioned, p. 49) in *Amoebæ*.
76. Kuhne (at place mentioned, p. 49, 64).
77. Ibid. p. 51 (*Amoebæ*), p. 67 (*Actinosphærium*), p. 90 (*Myxomycetes*), p. 106 (*Tradescantia*).
78. Ibid, p. 66 (*Actinosphærium*), p. 100 (*Tradescantia*).

substance of muscle. Kühne saw fresh water *Amoebæ* (79), *Actinosphærium* (80), and *Myxomycetes* (81), perish quite rapidly, accompanied by turbidity, coagulation, and finally dissolution, under the influence of extremely dilute solutions of this poison, the reaction of which was scarcely alkaline and even neutral. Cells of *Tradescantia* exhibited normal movements after seventeen hours' continuance in a watery solution of Veratrin. Binz (82) and others have concluded that Quinine exercises a specifically strong hindering influence upon the spontaneous movements of many varieties of protoplasm; also upon the colorless blood corpuscles. Still I noticed that at least the lymph cells of frogs, which had received, by sub-cutaneous injection, a large dose of quinia sulphate, only died after many hours of vigorous movement.

(Concluded in April number.)

THE RETICULAR STRUCTURE OF THE BLOOD CORPUSCLE.

Discussion of Dr. M. L. Holbrook's Paper on "The Termination of the Nerves in the Liver."

Dr. T. S. Up de Graff said, That Dr. Holbrook has pursued this subject for the past three or four years, and in the most painstaking manner. He pursued it in the laboratory of Dr. Heitzmann, in New York, and I look for still further results from his earnest studies.

Prof. Simon H. Gage said, He observed that Dr. Holbrook had adopted, apparently, the theory of the reticular structure of the blood-corpuscle. Many of the members were much interested in this matter; some who had adopted this view, and others who had not, were alike anxious to discuss and learn about this matter, and learn every method by which the truth can be ascertained. He would like to hear from Dr. Holbrook and others.

---

79. Kühne (at place mentioned, p. 47.)
80. Ibid, p. 65.
81. Ibid, p. 86.
82. C. Binz, ueber die Einwirkung des Chinin auf Protoplasmabewegung. Arch. f. Microscop. Anat. III., p. 383. 1867.

Dr. A. M. Bleile said, The question just referred to was a doubly important one, first, because we wish to know the fact of these nerve terminations, and second, because the solution of this question may enable us to learn the secret of the nerve force itself. He would like to ask a question: Has Dr. Holbrook used Ranvier's method at all?

Dr. Holbrook said, He had not.

Dr. S. O. Gleason desired to confirm Dr. Holbrook's observations. He had worked with the Doctor in Dr. Heitzmann's laboratory in New York, and he had studied the slides which Dr. Holbrook had sent him from time to time, and he wished to add his own observations in confirmation of the view of the terminations of the nerve fibre which had been set forth.

Dr. Geo. E. Fell said, He hoped there would be a full discussion of the question of the structure of the blood-corpuscle which Dr. Holbrook had referred to in his paper. Some of the former pupils of Dr. Heitzmann were present, and others who had claimed to have seen the net-work. The subject was of great interest to the histologist and all interested in the use of the microscope, he hoped the views of those present would be clearly brought out.

President Blackham said the way was open to any one who had a lance to break on the subject.

Dr. Krackowizer said, That he spoke as one whose lance was sure to be broken. He only wished that some one competent to do so would give us a continuation of Prof. A. Y. Moore's article in *The Microscope* for August, with blackboard illustrations. We were all anxious to learn if this reticular structure, or the granular structure, or some other structure, is the true one. To add his mite of information on the subject, he would say that his old instructor in Leipsic, Prof. Ludwig, taught them from *a priori* reasons, that it was possible and probable that the red corpuscle had a nucleus, but he never asserted that the nucleus had been seen and its existence demonstrated.

Dr. W. C. Barrett said, That it was with diffidence he attempted to speak upon this subject, because his observations had been limited in extent, and had been made in conjunction with two more competent microscopists who had not seen what to him seemed visible. But if his conclusions were not identical with those of either of his co-laborers, those observers were in no better accord with each other. After all, their united experience only served to corroborate what we had this morning been told, that we are not sure that we see what we think we see, or even that we see anything at all. The supposed appearance in any given case, according to the reasoning of some of our modern Thomases, may be but a diffraction image, and not a reality. Our predilections and prepossessions often lead us astray in graver matters than the observation of these little blood-corpuscles. Consciously or unconsciously, the biased mind is looking for an expected revelation; and what wonder that in the use of any high microscopical powers, the same appearance may be by different observers, variously translated.

From *a priori* reasoning, the speaker said, he was predisposed to accept the reticulated structure of protoplasm. It was absurd to suppose that the substance which composes the whole structure of certain complete animals, was structureless. The mind could not conceive of voluntary or spontaneous motion in any structureless body. A drop of homogeneous jelly can only move or change its form by an exertion of external force. Or, if that so-called structure be but an aggregation of the disconnected granules, movement is equally impossible. They must either be connected in some way with each other, or they must have differentiated organs to act as propellers. If then, the amœba or the pus-corpuscle be entirely homogeneous, any inherent movement is impossible. Hence we must suppose some kind of structure, and to account for the phenomena exhibited a reticulum of some kind seems most plausible.

Again, it is scarcely probable that we have reached the initial point in biology, which a structureless protoplasm must of necessity form. It will not answer the demands of morphological growth, and hence we must look yet further back for the starting point of organic genesis. Therefore, a structureless sarcode, or one containing but independent granules, seems an utter absurdity.

He did not assert that he had seen the reticulum of Carl Heitzmann, but he does claim that he has observed something more than free granules. If he has not seen these bodies connected by filaments, he has, he thinks, seen movements that can only be explained by some communicating relations that directly point to a filamentous conjunction. The subject is an overwhelmingly important one, and it would better become us, as scientists, to enter into an exhaustive study of the matter, than to content ourselves with endeavoring to tear down that which another has reared upon ground confessedly unexplored by us, save only by casual excursions into its borders. That protoplasm has a structure of some kind was to him a certainty, and the only way in which Heitzmann's theories or observations can be positively disproved, is by demonstrating what that structure is. It cannot be accomplished by attacking the competency of a man of ability who has spent his life in microscopical research, or the character of the objectives with which all that we now know of histology, has been learned.

Dr. T. F. Lucy said, He was interested in this paper and the discussion. The *Infusoria* and that order of the animal kingdom are sometimes spoken of as nerveless. They are not. They have no nerve-fibers that have ever been discovered, but they have nerve action, and in this he was supported by the Microscopic Society, of which he was a member, and by no less an authority than Prof. Huxley. Doubtless in plants, also, in the same way, nerve matter and nerve functions exist without any proper fibers. This is of interest in the question of ultimate nerve termination. Wherever there is nerve action there must be, he thought, nervous tissue, whether it was in the highly organized form known as fibers, or tubes, or what not.

Dr. Krackowizer asked, If any one present would give a plain account, from his own experience, how slides should be prepared to show the nucleus, or the reticular structure of the human red corpuscle.

Dr. Geo. E. Fell said. That he had failed to see the reticulated structure, though strictly following the directions of Dr. Heitzmann, and using objectives of high angle, the best that could be procured, made by Ed. Bausch. He had also used high-power lenses, of medium angle. To enumerate : The new formula objective, $\frac{1}{8}$ inch, homogeneous immersion, N. A. 1.43 of Bausch & Lomb ; a Spencer "duplex," $\frac{1}{8}$ inch B. A. 127°, and a $\frac{1}{18}$ inch immersion of Gundlach, of medium angle, were all used in the examinations. Now, if Dr. Heitzmann and his pupils can see this structure, we should likewise see it, for the members of this Society have as good lenses and as good eyes as any body of men in existence. It might appear that the subject was overdone, but when we consider its value to science, if true, and the errors promulgated through acceptance of it, if not so, we cannot make too much of it, or examine into it too closely. He had seen some such structure when the object was out of perfect focus, but it always disappeared when the focus was carefully adjusted. It was not entirely for the histologist to decide the question, but it was open to any good observer with the microscope. The question is not, whether protoplasm has a complicated structure or not; but if it has, is it a reticulated structure, as described by Dr. Heitzmann?

Dr. T. S. Up de Graff said, His experience had been similar. Using a homogeneous $\frac{1}{12}$ inch, by Gundlach, he could see no such structure. except when the lens was in wrong adjustment, or out of focus, when something of the sort was visible.

Dr. J. O. Stillson said, That he had been a student with Dr. Heitzmann, and had very frequently seen the doctor in great enthusiasm over the demonstration of this structure. He had often shown it to his students, and of course they assented to it, but he must confess that he had never been able, though using the best modern lenses, to demonstrate the existence of this structure to himself in his own private work since, although he was not ready to actually deny its existence.

Dr. Mercer said, He had put a Powell & Lealand $\frac{1}{12}$ inch on the corpuscles, without finding any such structure. Moreover, if such a structure should appear, it would be so fine that it would come under Abbe's diffractive laws, and might be really reticular, or something very different, which mathematical analysis only could determine.

Mr. Geo. C. Taylor said, He had hunted for months for this structure, but in vain. He doubted its existence, but was willing to be convinced to the contrary. He described the experience of a friend who had shown some corpuscles to the veteran Dr. Leidy, declaring that there was the net-work, and eagerly asking the doctor: "Don't you see it?" received the reply: "Yes, I see it. I see its granules; but there's no net-work there."

Dr. W. C. Barrett said, He had seen several criticisms of the cuts shown by Heitzmann; but it ought to be remembered that these did not pretend to be actual fac-similes of what could be seen; they are only schematic. It would not do to put away these observations too easily, on the plea that the structure is the result of bad focusing. It must be remembered that Dr. Heitzmann and the others are not novices. They know when a glass is in focus.

Mr. E. S. Nott said, He had studied the corpuscle, and had seen the reticular structure when the corpuscle was slightly out of focus.

Dr. M. L. Holbrook said, He had been one of Dr. Heitzmann's pupils formerly. He thought he could state that he had seen the reticular structure often. One would not, however, see the structure in red corpuscles in general. The first case where he saw it was in a corpuscle in some urine, from a case of neuralgic nephritis. He thought, perhaps, from his experience in such observations, that urine was a good re-agent to bring out this structure. Osmic acid was also a good re-agent to bring it out. He did not recollect the exact proportions to secure the best results. In a work on the brain by Dr. I. Luys, published by Appleton, the structure of the brain cell is given almost precisely the same as Heitzmann gives that of the blood-corpuscle. I first saw it in the yeast cell. It shows also in the pus cell; not so readily in pus from a strong constitutioned person as in that of a weak constitutioned one. In ordinary pus the trouble is that you can see only a bright dot, so highly refractive that it shines like silver, and you cannot see any structure, but sometimes you will see a pus corpuscle from which the protoplasm is partially gone, and in them you will be able to see the net-work, and when you see these different kinds of pus corpuscles in the same field, it is a pretty sure sign that you have not been deceived by your expectation of seeing the reticular structure. It seems, indeed, most rational to suppose that the cell is organized structure like all the rest of the body, and not a mere shapeless lump. He further stated that a one-half per cent. solution of osmic acid, brings out the structure referred to in the epithelia of the lungs.

Dr. T. S. Up de Graff wished to kow if Dr. Holbrook saw this structure only in the shriveled part of the corpuscle, or in all of it.

Dr. Holbrook said, That sometimes, and indeed generally, the other half is entirely empty; there will be nothing at all then to see.

Dr. Mercer wished to know what became of the reticular structure during the great distortions of the amœboid movement and intramural migrations of the blood corpuscle.

Dr. Holbrook said, He could easily manage that.

Dr. Theodore Deecke said, He had sometimes seen a peculiar reticulated appearance of the blood corpuscle, and had always ascribed it to some peculiar and merely temporary condition of the protoplasm in the corpuscle, and not to any real structure of the corpuscle itself. The blood corpuscle is a very changeable thing, varying in size at different times and in different parts of the body, smaller when it enters the lungs than in other parts of the body, and changing in color and appearance. Hence he had little confidence in the measurement of size being of any evidential value in murder cases. He thought this so-called reticulated structure was only a peculiar arrangement of the protoplasmic contents of the corpuscle.

President Blackham said, The propriety of discussing here the question of a true or imperfect focus of the objective in the examination of the corpuscle, had been called in question, but it should be remembered that the example had been set by Dr. Heitzmann himself, and he had from last year's proceedings of this Society, a letter from Dr. H., as given on page 43. When any one assumes to tutor an experienced microscopist in that style, he must not expect his own methods and results to be untouched by criticism. He had himself followed Dr. H.'s directions, as given in the letter just read, explicitly, taking every precaution and using the very best lenses and instruments. He had been shown the structure, too, by Dr. H. himself, in his own laboratory in New York, when he was his guest, and while he was not quite willing, under these circumstances, to say to the Doctor that his glass was out of focus, that had been his private judgment at the time. He determined to study it more carefully at home, and did so. He saw the corpuscle full of granules, but with no connection between them. Then, determining to see the structure anyhow, he turned the fine adjustment till clear out of focus, when he saw a sort of blur, extending apparently from one granule to another, which might be regarded as a net-work, but whenever the focus was exactly adjusted this apparent net-work disappeared, and the individual granules re-appeared. To make sure of there being no mistake, he sent for a friend, a physician and microscopist, on another evening, and without telling what he was in search of, asked him to describe what he saw. He saw and described the granules only. Asking him in a tone of surprise, if he did not see the connecting net-work, he said, "No; it might be there, but it must be very obscure; *he* could not see it."

Dr. Krackowizer said, We could not find a verdict for the net-work; half of the witnesses had seen it, and half, or more than half, had not; therefore, according to legal rules of evidence, he did not believe it was there. Certainly, to demonstrate so important a discovery to so large a body of scientific microscopists as are here assembled, was well worth the time of Dr. Heitzmann to come such a short distance as from New York here. He has not even appeared here at all, and being so exceedingly confident in his own views, as we know him to be, it is, to say the least, somewhat significant that he did not even attempt to demonstrate his theory. For himself, he did not regard it as settled that the red blood corpuscle is even a true cell, with a nucleus and a true membrane or cell-wall. We have as yet no proof that it is a true cell at all.

Dr. A. M. Bleile said, He believed the red corpuscle had a reticular structure of some sort, though he had not seen it himself, and did not believe it was just as Dr. Heitzmann had described it. Some things, going to support his view, he would mention : first, the experiments of Wooldridge with the effect of sulphuric acid : The blood was drawn, defibrinated, and then mixed with a dilute ($\frac{4}{10}$ of one per cent.) solution of sulphuric acid. The corpuscles changed from their ordinary red color to a pale, transparent appearance, showing that the structure of the corpuscle was changed ; yet it was not destroyed. He also described Prof. Gaul's experiments with defibrinated frog's blood on the warm-stage, when little, worm-like projections shot out from the corpuscle and separated, while its main structure was still remaining, not breaking down till several of these pseudopod-bodies had separated. All this showed that the corpuscle had a structure of some kind, and of some considerable strength,

Dr. J. O. Stillson said, That in experimenting upon bacteria with various reagents, he was led to study the effect of strychnia, and so came to notice its action upon the red and the white blood corpuscle, and he had observed an appearance almost identical with that described by Dr. Holbrook. Evidently this motion of the white corpuscle is due to some power residing in itself. Now if there is any such reticular structure a contraction of its fibers might cause those amœboid movements and so furnish a satisfactory answer to the question asked awhile ago, as to whether these movements did not disprove the existence of such a structure. If we could prove the structure it would serve to explain the reasons by which such movements were effected. He had applied to the blood, various reagents, as hydrocyanic acid, strychnia sulphate, sulphuric acid, extract of calabar bean, etc., etc., and noticed their effects. He observed that the white corpuscle in its amœboid movements, moved very cautiously over the field of view, but the instant the solution of sulphate of strychnia approached it, it was thrown into terrible convulsions, and soon became apparently dead and still, having then, to his eyes, all the appearance of a pus globule, and having a kind of reticular structure. He distinguished the leucocyte from an ordinary pus globule by the appearance, but chiefly by the action of the above reagents upon it; he did not pretend to tell the difference exactly between a white corpuscle and a pus globule, but could tell by the reagents. He had never seen any sort of reticular structure in the red corpuscle. The color sometimes referred to in the *Deckpfarbe* was produced in the red corpuscle by the above reagents. [?]—*Proceedings of the American Society of Microscopists.*

ACIDS OR GERMS; WHICH?

1. The usual custom of testing for acids in the mouth by litmus paper is, to say the least, unreliable. Reaction upon litmus paper may show simply the presence of *harmless carbonic* acid in the saliva, when a careful chemical analysis may *fail* to show the presence of those acids that are capable of even *abrading* the teeth.

2. The observations of the several microscopists cited, agree in showing that in true caries the *organic* portions of the teeth, or protoplasmic fibrils, are first attacked by *various organisms*, and that their presence in the tubules, and their branches, is in advance of visible decay, thus destroying the *structure*, as the first step in the progress of caries.

3. Chemical experiments show an *absence* of acids, and compounds of acids with lime-salts. except phosphates and carbonates, in the decayed masses, and that the lime-salts are *present* in substantial, normal proportions, excepting upon the *outer surface*, from whence they have been washed away, or removed by mechanical or other outside influences. Hence, no *solution*, relatively, of lime-salt. That when the teeth are acted upon by acids, an *abrasion*, simply, is the result. Acids acting upon a tooth, produce *combinations* of lime-salts that are *neutral*, or *inactive* in tooth destruction. For instance, acetic acid applied to a tooth, produces, as the first result, *acetate of lime*, a perfectly harmless or neutral agent.

4. The most potent remedy, or preventive treatment, is that which results the most effectively in the conservation and strengthening of the "vital forces" of the system. Topical remedies, to be most beneficial, should be antiseptic.

5. The latest investigations in the three-fold field of histology, microscopy and chemistry point, with surprising harmony, to the *germ* theory as the most reasonable cause of dental caries. It explains more satisfactorily, and best harmonizes with, the observations of phenomena of daily practice. It makes intelligible nature's observed resistant processes, such, for instance, as Magitot's "zone of resistance." Lime-salt being much more easily soluble by the action of certain acids than the *organic* structure, it would seem a great blunder on the part of nature, to fill up the tubuli with this material *if* acids were the attacking enemy. Whereas, granting the claim that *germs* constitute the attacking forces, and that the protoplasmic fibrils are the points of attack, then nature seems to be "sound-minded" in barricading with mineral substances, the entrance to the tubuli.

6. The same inference may be applied with equal force to the relative ease with which "soft" teeth are attacked as compared with "hard" teeth. If the acid theory is true, "hard" teeth should succumb as readily as the "softer" structure—in fact, more readily. Whereas, if we accept the *germ* theory, the unvarying opposite phenomenon is explainable. The vitality of a tooth is in its *organic* structure—not in its *lime-salts*—and if the vital conditions are unequal to the task of *building* solidly and strongly, the *defensive* quality of the structure is correspondingly weak, and yields to a much less vigorous attack of the common enemy.—STOCKWELL, *New England Journal of Dentistry.*

◆

PRIZE WITHDRAWN.

The special prize of forty dollars, offered annually for several years past, by Dr. A. M. Holmes, for the best essay on improvements in dental practice, has been withdrawn. No reason is given for this action, but the fact that the prize has never been bid for is probably the correct one.

CONDUCTORIAL.

"PROTOPLASMIC MOTION."

The article with which this number of the ODONTOGRAPHIC JOURNAL opens, and which will be concluded in the April number, herein makes its first appearance in English dress—a fact that will be appreciated by those interested in the study of protoplasmic structures, but whose ignorance or indifferent knowledge of the language of Mark Twain's hospital patient, from whom "a word of thirteen syllables was successfully removed" by the surgeons in charge, compels them to confess German a sealed book.

On or before the first of April the article complete will appear in pamphlet form.

We have just received the following from the translator:

This article is translated from part first of the recently issued *Handbook of Physiology*, edited by Dr. Herman, Prof. of Physiology in the University of Zurich. The latter is the latest and most comprehensive work in this branch, being a cyclopædia of the science resembling that of Ziemsen in *Practice of Medicine* and that of Ashhurst in *Surgery*. Dr. Th. W. Engelman, the author of our article, is Prof. of Physiology in the famous University of Utrecht, which, with its valuable library of 50,000 volumes, its laboratories and botanic garden, takes the lead among the universities of Holland. Dr. Engelman's monograph is especially valuable as being a digest or resumé of the opinions of the most eminent investigators into the physiology of protoplasm, being replete with valuable references, and giving in a condensed form the leading facts concerning the phenomena of protoplasmic movement, as well those hypotheses most favorably received by physiologists.

◆

EDITORIAL CONNECTION SEVERED.

The following is from Dr. C. W. Spalding's "Valedictory," in the *Missouri Dental Journal* for December.

"It is with sincere regret that we now announce to our readers that our editorial connection with the *Journal* ceases, for the present, with the issue of this number, and will not be resumed for at least one year."

And this tells why he does it :

" A new vocation of a scientific and business nature will engage fully one-half of our time throughout the coming year. This employment will occur at periods of uncertain length, and hence will prevent the giving of that regular time and attention to the work which is required by the issue of a monthly periodical."

His return to journalistic work will be hailed with delight by his many friends. Such men are born, not made.

DENTAL LAW.

The following paragraphs are from the minutes of the last annual meeting of the New York State Dental Society. They are of interest to district censors on the State Board, and to committees of district societies, where such committees have been or are likely to be appointed :

" On motion of Dr. Barrett (one of the committee), each district censor was appointed to co-operate with the committee on Dental Law in the enforcement of the law. * * *

" Resolved, That the district societies be requested, in the appointment of committees to act towards the enforcement of the dental law, to instruct such committees not to take any action independent of the State Committee."

A CHANGE.

The *Independent Practitioner* starts out their year under new management editorially, our neighbor and friend, Dr. W. C. Barrett, of Buffalo, assuming full charge of the dental department. Those who know Dr. B. do not need to be told of the independence and general soundness likely to characterize any venture in which he has an interest, an that he has an interest in this matter follows necessarily from what he has said at various times in regard to dental literature and dental journalism. May his greatest expectations, and those of his associates, be more than realized.

UNIVERSITY OF CALIFORNIA—DENTAL DEPARTMENT.

The Dental department of the University of California held its *first* commencement exercises at B'nai B'rith Hall, San Francisco, Wednesday evening, November 8th, 1882.

An address on behalf of the State, was delivered by Governor George C. Perkins ; that on behalf of the Board of Regents, by Rev. Horatio Stebbins, A. M., D.D.

The valedictories were by the Dean, Prof. S. W. Dennis, M. D., D.D. S., and Henry J. Plomteaux, of the graduating class.

The number of matriculates was thirty-two. The degree of D.D. S. was conferred on the following members of the graduating cless, by W. T. Reid, A. M., President of the University : Thomas W. Hall and Henry J. Plomteaux, of Oakland, and Charles W. Hibbard, Thomas Morffew, Charles W. Richards, William H. Stanley, Gustav W. Sichel, M. D., and August Van Crombrugghe, of San Francisco.

Unlike Eastern colleges, the Medical and Dental Departments of the University of California hold their sessions in summer.

◆

TO DENTAL EXAMINERS.

The following is a copy of a circular received a few days since by Dr. F. French, Vice-President of our State Society and Secretary of the Board of Censors. Other members have probably been similarly favored. The object of the meeting is certainly a good one, but the choice of place strikes us as unfortunate. Lexington may be central to those states having examining boards, and comparatively easy for some to reach ; but Chicago, we know, would better please the representatives from this section :

LEXINGTON, KY.. December 6, 1882.

To the President and Members of the State Board of Dental Examiners of New York :

GENTLEMEN :—At the late meeting of the American Dental Association, held at Cincinnati in August last, there were present at least twelve members of State Examining Boards, representing five different states. An individual interchange of experience and opinion relative to methods of examinations, possible uniform standard of qualifications and other matters of import, revealed the fact that under the present state of things, it could scrcely be hoped to apply the law with anything like uniformity in the different states, on account or imperfect knowledge of many important points connected with the same, and its enforcement. In order to bring the matter into more definite shape, a regularly organized meeting was held, at which every member of an Examining Board in the city, was present. Here the objects of the meeting wore more fully discussed, and in furtherance of the views of those present, the undersigned were appointed a special committee. The duty of this committee is to communicate and consult with the different State Boards of Dental Examiners, to discuss all matters of importance relative thereto, and arrange for a meeting at a central point for representatives from every state which has an Examining Board.

The necessity for such meeting is certainly not within the pale of doubt, since the objects to be attained are of both special and general interest, and shared in common by our colleges, the profession, and the community at large. To state these objects briefly it is desirous that we secure unity of effort and systematic action relative to all questions touching the manner and standard of examinations, the uniformity of the laws' action in the several states in which Dental Laws exist, the relative duties of our profession, Boards of Examiners, and Dental Colleges, and the permanent organization of a society to consist only of members of State Boards of Examiners. Among the many questions which have already arisen, and which will, in the near future, come up more frequently and persistently, is that of receiving the certificates of qualification of other State Boards in lieu of a re-examination. Some State Laws are silent on the subject, while the laws of Illinois positively prohibit it. In behalf of those to whom is entrusted the execution of the law, in behalf of the dignity of the law, and for the sake of those amenable to the same, and seeking its protection, this latter question should be hastily and definitely settled. The more fully these matters were discussed, the more it became evident that a full meeting of representatives of the different State Boards ought to be had, so that all matters of importance might be discussed and proper conclusions arrived at.

In pursuance of the wishes of this Cincinnati meeting, the Committee would earnestly request your Board to send its duly authorized representative to a meeting to be held in the city of Lexington, on the 20th day of February, 1883, beginning at 2½ o'clock, and continuing one or more days as necessity may demand. Headquarters, Phœnix Hotel.

A. O. RAWLS, Kentucky,
F. H. REHWENKEL, Ohio, } Committee.
A. W. HARLAN, Illinois.

PELLETS.

We learn with regret that Dr. J. J. Woodward, U. S. A., who has just returned from Europe, derived little or no benefit from the trip. This will be sad news to his many medical and microscopical friends.

The editor and publisher of the *Medical Bulletin* (Phila.), Dr. J. V. Shoemaker, is in the best of spirits and wants to shake hands with everybody, whereat we rejoice and are glad. Read! "Now, *The Bulletin*, having good cause for gratitude, inasmuch as for the first time in its life it has proved self-supporting, and with a good outlook for the future, feels disposed to share with its friends the happy feeling which at present it enjoys."

Dr. W. H. Dorrance characterizes the so-called "Folsom patent" as "an ordnance map of ridges."

"ODONTOLOGISHCHE FORSCHUNGEN" is noticed at length in the December number of the *Dental Cosmos.* "J. T." is the reviewer. If a translation of this work is desirable, and can be made reasonably profitable, why should not he become its translator, adding such footnotes as years of labor as a teacher and practitioner would naturally suggest.

It is coming from many sources that the profession is on the eve of giving up the chemical theory of dental decay. For what?

The "bug theory" begins to "boom."

The next meeting of the AMERICAN SOCIETY OF MICROSCOPISTS will be held in Chicago. The first circular is already out, copies of which may be had by addressing President Albert McCalla, Fairfield, Iowa.

In a newspaper report of the doings of a dental society, Dr. J. Requa, of this city, is credited with the reading of a paper on "Delusion a cause of periostitis." It might have been worse.

In a restatement of Dr. Allen Y. Moore's "method of differential staining by which his fine slides of blood corpuscles are produced," the *Dental Record* (Eng.) says the slide is flooded with a distilled water and alcohol "solution of rosin five grains." We haven't tried it, nor do we intend to; but many amateurs have, to their disappointment and disgust. When they change *r* to *e*, and thus make "rosin" read "eosin," they will be likely to indulge in language that would not look well in a Sunday school book. And may their sins be placed to the credit of the editor of the *Dental Record.* The December number of the *Missouri Dental Journal* repeats the blunder.

BOOKS, PAMPHLETS, PERIODICALS.

Dental Metallurgy: A Manual for the use of Dental Students: By Chas. J. Essig, M. D., D. D. S., Prof. of Mechanical Dentistry and Metallurgy in the Dental Department of the University of Pennsylvania. Philadelphia: The S. S. White Dental Manufacturing Company. Pp. 253.

We clip the following from the preface: "The object of the author in the preparation of this manual, was to place in the hands of students of dentistry an outline of the scientific principles involved in the reduction of the metals, their properties, the modifications resulting from alloying, and their application to dental uses."

It is needless to say that the object as above set forth, has been fully attained. Chapter V will interest amalgam makers and amalgam mixers more, perhaps, than any other in the book, as it contains many points hitherto unpublished—at least in concise form.

Etiology of Dental Caries. Acids or Germs; Which? By Dr. C. T. Stockwell, Springfield, Mass. Pp. 15. Reprinted from the *New England Journal of Dentistry.* We give the author's "inferences from the foregoing," on another page.

Some Fallacies of the Bioplasson Theory. A Reply to Dr. Heitzman. By Lester Curtis, M. D. Pp. 7. Reprinted from the *Dental Cosmos.*

Nervous Force: Its Origin and Physiology. By W. C. Barrett, M. D., D. D. S. Pp. 15. Reprinted from the (it doesn't say so, but we recognize the type) *Ohio State Journal of Dental Science.*

THE DENTISTS' BEACON LIGHT. A quarterly journal. Edited by Dr. Edgar Palmer. Pp. 12.

Designed for the use of the laity and very well adapted to that end.

Diagram (in colors) of Human Incisor Tooth. By Frank Abbott, M. D., etc. Philadelphia: The S. S. White Dental Manufacturing Company. Price $1.00.

This beautiful and instructive diagram, which is published by request of the Dental Society of the State of New York, is a reproduction on a small scale, of the colossal diagram exhibited and described by Prof. Abbott, and so much admired by members of the State Society, at Albany, last May. It is so complete that an hour's study will give one a better notion of tooth anatomy than a whole week's reading of books. Without question it is the finest thing of the kind ever offered the profession, and it should be at the elbow of every man whose time is money and whose money is earned in work rather than talk. Talk is cheap, but this diagram discounts it ten to one and will more than pay for itself on the first inquisitive patron—that one who merely wants to know "What is the 'nerve' anyhow?"

We acknowledge the receipt of the following: Zahntechnische Reform (Berlin), Dental Record (London), Missouri Dental Journal, Dental Cosmos, New England Journal of Dentistry, Dental Register, Ohio State Journal of Dental Science, Dental Advertiser, Southern Dental Journal, Medical Record, Mechanical News, Medical Brief.

FILINGS.

The latest remedy for toothache, says *New York Commercial Advertiser*, is twisting a mule's tail. The cure may not work, but the animal never fails.

The medical man on the New Haven *Register* says that when "Dr. Bliss received the $6,000 offered instead of the $25,000 demanded, his respiration was slow, his pulse rapid, and his pus cavity distended with bile."

Professor Virchow has in his Berlin laboratory a collection of six thousand skulls, which he prizes very highly. It would be a difficult matter, of course, for any rival collector to get ahead of him. And yet as a skuller he don't begin to compare with Hanlan.